YOUNG CHILDREN (0-8) AND DIGITAL TECHNOLOGY

A qualitative exploratory study - National report - BELGIUM

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Executive summary

Key findings

1. **Kids love technology and digital technologies are an integral (but not dominant) part of children's lives**. This means that even though children love playing digital games or watching videos, they also enjoy performing other non-digital activities. The latter includes practising sports, playing with their toys, going to the playground, riding their bike, going to the swimming pool, etc.

2. **Young children mainly use digital technologies to have fun**. Their favourite and most common activities are watching TV, watching video clips on YouTube and playing digital games. Children usually use tablets or iPads to perform these activities, sometimes they also use their parents (smart)phones or game consoles. Very few children referred to laptops or desktops. Some of the children interviewed are able to use tablets or iPads quite independently. Many are able to navigate from one screen to another, to open applications, to go back to the main menu, etc. and a few of the oldest ones interviewed were able to find new games or Apps and even to download them. Children, however, could only download free games or apps because parents usually set up account restrictions so that their children cannot buy online or have access to inappropriate content. Young children also love YouTube. They can find and watch videos on the platform and even some of the youngest ones interviewed were able to recognise the YouTube icon. Of the children we were able to observe using tablets, iPads or smartphones, most of them were able to select films from the side menu, although not all of them were able to type in words in the search field.

3. **Digital literacy varies a lot among children.** What remains constant, however, is the fact that, in general, young children`s digital skills are low (as compared to older children or adults) and the highest skills are observed among the oldest ones. In general, children have some grasp of device and game navigation. Navigation is notably eased when young children do not have to use the mouse or other game controllers. This was particularly noticeable in the case of the youngest children (4 or 5 years-old) who had difficulties (or were unable) to play games on game consoles such as the PlayStation or the Wii. They also found it very difficult to use laptops or computers. Very few children go online to find information other than YouTube films or a favourite TV programme or digital game. The ones who do are usually 6 or older and they can read and write, although not fluently. Because of their very limited search skills many young children turn to their parents to find the information they want.

4. **Several factors affect young children`s uses and skills of digital technologies.** These include family constitution, family/parental style, daily routine, and even the neighbourhood. Above all, kids watch and learn from parents, but also from other relatives, friends and peers. Children`s perceptions of technology are highly mediated by their parents` access and use. This means that their experiences with digital technologies and also their perceptions of them are highly influenced by their parents` attitudes towards technologies, but also by their daily use. Parents, however, are not the only source of influence. Other family members, especially older siblings, but also grandparents or uncles play an important role. This is particularly noticeable in those cases where parents' digital literacy and/or their digital consumption is low.

5. **Few (and only older) children refer to digital technologies as a means for learning things,** for instance, learning songs (lyrics), dance steps, but also math or foreign languages (e.g. watching English TV programmes to keep up a second language). As stated above, for children the main reasons for using digital technologies are fun and relaxation, and to a lesser extent for bonding, i.e. a way of doing something together with significant others (e.g. communicating with loved one abroad). According to parents, the main reasons why they let their children use digital technologies are for fun, learning, school-related tasks, "reward-punishment" strategy, time-filler, "baby-sitter", and only occasionally, a way of doing something together with their children (bonding).

6. **Only the oldest children (6-7 year olds) seem aware of communication or social media functionalities** such as Facebook, e-mail or instant messaging applications. None of the children interviewed had a profile nor were they active users of any of these services, though. The ones who knew about their existence mainly did so because their parents, older siblings or other family members employed them and they had seen them using them, e.g. Facebook or e-mail. The only exception was Skype, which had been used by half of the families in our sample. In all but one of these five families Skype was used rather frequently. What all these families had in common was the fact that they had close relatives abroad (e.g. grandparents, aunts and even one father).

7. **Few of the children interviewed, and only the oldest ones, were able to use digital technologies in more advanced or creative ways.** For instance some (older) children can make videos, take photos ('selfies') or do homework, but creative engagement with technologies is not widespread at this young age, nor is it actively encouraged by parents.

8. **As regards online risks, children have some level of awareness, especially about commercial and "technical" risks**. Parents, on their turn, seem to trust that their young children won`t get into trouble online. This is probably mainly due to the fact that parents feel that they are successful in monitoring their children`s use of online technologies (e.g. by limiting the time they can spend online, or by not allowing them to download online Apps or games). Also the fact that most children of this age cannot write nor read fluently (yet) makes them less prone to encounter online risks because their digital experiences mainly happen offline. Last, some parents seem to underestimate their children's opportunities to encounter online risks. Parents, in general, seem much more anxious about the future risks their children may encounter than about current ones.

Recommendations

- **Finding effective ways of reaching vulnerable children is important.** In our pilot study we paid special attention to trying to reach a wide variety of families including more socially challenged ones. We were able to observe that even though, in general, young children`s (online) experiences are rather safe, mainly probably because they are not online that often, still a few children in our sample mentioned (or we observed) having encountered less pleasant online experiences such as viewing *"ugly naked women*" or *"silly videos"* or being exposed to commercial information (usually targeting adults, but sometimes also children). Even though our sample of

families is extremely small to make any generalizations, it is not unimportant to observe that of the few children who referred to unpleasant online experiences of any kind, most of them came from socially challenged environments and had parents with a low (general) literacy level. In another family, economic constraints prevented children from accessing digital technologies. They did not even have access to the internet or to cable TV because they could not afford it. The mother in this family, who had a high level of education, worried that their children would become digitally excluded especially as they grow older and more digital resources are demanded from them at school. It is, therefore, essential, to invest resources in studying more vulnerable children and their families, and to explore the ways in which these less privileged groups engage (or not) with digital technologies and the consequences thereof.

- **More initiatives should be developed to support parents, teachers, but also other carers (e.g. grandparents) to enhance their digital literacy and skills.** As observed in our study, parents trust that their children won`t get into trouble online at this young age. This is probably mainly due to the fact that parents feel that they are successful in monitoring their children`s use of online technologies and they feel confident in their capacity to protect their children from risks. Nevertheless, our study shows that when it comes to protecting children online, parents usually set-up time and technical restrictions (e.g. Children cannot download Apps or rent movies unless they ask their parents for a password), however they do not seem very aware of other types of risks such as the possibility of encountering inappropriate content, being commercially targeted or privacy risks. From this we inferred that more digital literacy for parents as well as for teachers and other carers is needed.

- **Initiatives directed at parents and teachers in the workplace can be worthwhile exploring** because they could facilitate participation and involvement especially of parents who work full-time or who have a busy schedule. Other ideas may include setting up practice guides, short (work-based) training modules and awareness campaigns focusing on the parents and teachers of very young children. Such training should also include information on how to encourage more creative uses of digital technologies, as well as teaching parents to guide and support their children prevent and cope with (online) risks. Employing existing knowledge platforms (e.g. Mediawijs.be in Belgium) to disseminate these initiatives and reach out to parents and educators can be particularly useful.

- **Schools have a major responsibility in supporting digital literacy initiatives.** Since schools are uniquely positioned to reach all children (and their parents), they should take a major responsibility for supporting children and their parents in gaining or improving their digital literacy skills and knowledge, including e-safety skills. This is a major responsibility; therefore school must be supported in order to succeed with this task, especially because many teachers and educators still lack the confidence and/or the necessary competences to deal with digital technologies themselves.

- **Education is crucial.** Systematic curricular programs that cover digital and media education from the earliest school years are needed. This is already happening in some Flemish schools, as mentioned by one of the families interviewed, but,

apparently, this is not yet a widespread initiative. It seems timely to start exploring the possibilities of incorporating digital literacy efforts as an integral part of the study programs of very young children.

- **Teachers should be continuously trained in digital technologies use and trends.** This will enable them to gain confidence and become more knowledgeable as regards these matters. Higher digital skills will help teachers to be better positioned to guide and support children in more creative, empowering and safe digital experiences. Teacher training programmes should also become an opportunity to introduce teachers into these topics.

- **Most of the parents interviewed have appropriated a "discourse" about the educational value of digital technologies.** However, our conversations with them and their children indicate that most parents do not really (know how to) benefit from the educational potential of technologies. They clearly need more guidance, for instance, in order to find educational content and to use it with their children or to explore more creative uses of digital technologies. Parents would, therefore, benefit from extra schooling. In particular, training should guide parents on how to stimulate their children to take up the opportunities digital technologies have to offer (e.g. creativity, informal learning, etc.) and should also help them recognise and cope with related online risks, for instance by enhancing parental mediation strategies. As suggested above, in order to facilitate parental involvement, these initiatives could be organised at the local level, or even at the workplace.

- **Enhancing children's digital skills is essential.** Nowadays, many (young) children are active (or proxy) users of digital technologies. Even though many of them may possess sufficient or even high technical skills for their young age, they are not cognitively or emotionally mature so as to understand the consequences of their behaviour on these types of platforms. Enhancing children`s and their parents` digital skills, but also increasing their awareness of potential risks and how to cope with them is essential in order to encourage a positive, safe and responsible use of digital technologies from a very young age.

- **Young children and their parents would benefit from more knowledge about commercial, advertising and data protection risks.** Supporting them in developing adequate coping strategies to deal with such risks is also essential. Many parents experience difficulties in understanding and adequately assessing online risks, in particular "hidden" ones such as data surveillance or targeted advertising. Helping them and their children become more aware of these commercial and advertising practices is essential, even at this very young age.

- **Families would benefit from the availability of more positive, educational and safe (online) content for young children.** Some of parents interviewed suggested creating platforms where such content could be gathered, shared and updated, for instance, a place where safe Apps for young children could be found. This and other possibilities to provide positive, safe and engaging, child-friendly content should be explored.

- **Innovation should accompany user empowerment.** Technological developments (e.g. new techniques for tracking and exposing online consumer behaviour) should take into consideration that, as observed in our study, many young children are using their parents' or other adults` devices such as laptops, tablets or even smartphones. This raises important concerns, including the risk of children encountering commercial or other types of online content not meant for, or simply inappropriate, for them.

- **Industry should take steps to ensure an adequate level of enforcement of children`s rights on their platforms**. In particular, they should give high priority to children's rights to privacy, data protection and freedom of expression, and protect them from inadequate commercial practices as well as from other potentially harmful risks (e.g. content, contact and conduct risks).

- **Children should be empowered "by design".** This can be achieved by adopting more socio-technological approaches such as e-safety or privacy "by design". It is also advisable that the industry explores effective mechanisms to embed digital literacy enhancing practices into the technologies they develop (e.g. tools to enhance parental mediation rather than purely restrictive parental control tools). Other areas worthwhile exploring are improving the efficiency and user-friendliness of content labelling mechanisms and reporting tools, or offering easily accessible and child-friendly information about online risks and safety on the services they offer to children and their parents.

- **Industry should support social media literacy initiatives**. People, including parents and teachers, turn in a natural way to the internet for practical guidance on all sorts of topics. Therefore, these channels should become incorporated in digital literacy strategies and campaigns targeting young children and their parents.

- **Researchers should make efforts to gather more evidence on the less explored, and more positive aspects related to the use of digital technologies by very young children.** This could include the ways in which children and young people's use of digital technologies may contribute to creativity, informal learning and active cultural participation.

- **More interdisciplinary research is needed.** Digital technologies can have an impact on different levels of children`s lives and their families. Therefore it is necessary that we approach these phenomena from a multidisciplinary perspective.

- **Research should target all ages including very young children (0-8) from whom mush less research and data is available and also the most vulnerable groups of society**. Even though lots of research has been published about older children and teenagers` experiences with digital technologies, very little research has focused on very young children, and especially vulnerable ones. An important challenge ahead is exploring adequate and innovative research mechanisms to reach and study these groups.

Proposal of implementations

- **Research on young children's use and perceptions of digital technologies needs to adopt a child-centred and playful methodology**. Young children, especially five or younger, find it difficult to keep focused on activities for more than a few minutes and struggle with reasoning at an abstract level. Therefore, traditional, verbal-based interview formats are not appropriate for this young age group because they get easily bored or tired. This is particularly noticeable in cases when two or more children are being interviewed simultaneously. If the youngest ones do not get the full attention from the researcher, they simply disengage from the interview and start doing something else. Therefore, a big challenge for researchers dealing with this young target group is to develop child-friendly data collection methods which, on the one hand, keep (multiple) children engaged and, which, on the other hand, allow extracting relevant information. One example of such a strategy is to let children engage with their favourite digital activities or to use visual cues to direct the conversation to a certain topic. In this pilot study, observing children interact with digital devices, taking and discussing pictures or cards, and making use of screenshots of some of their favourite digital activities proved valuable strategies to capture, at least partially, the digital lives of young children. Given that observations are an important constituent of such a child-centred methodology, we suggest to video record these sessions in order to facilitate and enhance the subsequent data analysis process.

- **Research on young children's use and perceptions of digital technologies needs to adopt a flexible methodology.** A child faces numerous cognitive, affective and corporal developmental challenges during the first eight years of his or her life. As a result, children between and within zero to eight age cohorts widely differ in their preferences, abilities and capacities. Researchers should therefore develop flexible investigative methods that can be adjusted to the developmental stage young children are in.

- **Research on young children's use and perceptions of digital technologies should focus on digital activities rather than on devices.** While the interview protocol of this pilot study puts lots of emphasis on digital devices, we observed that young children and parents place the focus of their narratives on their digital activities. The devices they use are, in most cases, merely a means to an end (e.g. Using the tablet or the smartphone to play games or to watch videos on YouTube). Therefore, an activity-centered interview protocol may be more adequate than one focusing on devices.

- **Research on young children's use and perceptions of digital technologies would benefit from multiple contacts with the respondents.** In this study the entire interview session lasted two to three hours and was very intense especially for younger children. Multiple visits would be useful to 1) minimize the cognitive burden on young children, 2) facilitate establishing a trust relationship with the family members and 3) can serve as a limited member check procedure. The latter is especially relevant in order to enhance the internal validity of the study.

- **Special efforts should be made to reach more socially challenged families and to adapt the methodology accordingly**. In our case we paid extra attention to vulnerable groups while recruiting our families. We tried to reach them through social work institutions, but also through directly targeting schools in more vulnerable neighbourhoods. We also offered these families the possibility to be interviewed in places other than their own home, as this can be problematic sometimes. One of the families welcomed our invitation and we arranged to interview them at an after-school centre which their children attend when they finish school.

Introduction

This report is part of a larger European study involving seven countries, which is funded and co-ordinated by the Digital Citizen Security Unit Institute for the Protection and Security of the Citizen in the European Commission. The observation and analysis protocol were co-designed by the different project partners and was coordinated by the Joint Research Center. Each partner, however, had freedom to adapt the interview protocol and to explore strategies and techniques better suited for the younger children in their sample.

In collaboration with a selected group of academic partners in different European countries, this qualitative study aims at exploring young children and their families' experiences with new technologies. This pilot research generated data to address the overall question: In what ways are children and/or their families empowered by the use of (new) digital technologies? In particular, the following research questions are addressed in this report:

1. How do children under the age of 8 engage with new (online) technologies?
2. How are new (online) technologies perceived by the different family members?
3. What role do these new (online) technologies (smartphones, tablets, computers, video games, Apps, etc.) play in the children's and parents' lives (separately and in relation to family life in general)?
4. How do parents mediate their younger children's use of (online) technologies (at home and/or elsewhere)? Are their strategies more constructive or restrictive?

This national report presents the initial findings from the pilot qualitative study on young children and digital technologies conducted in Belgium with ten families with children aged 6 or 7, their siblings and their parents. The study aimed to provide insights about how young children appropriate and perceive digital technologies, their contexts of use, the factors influencing their digital experiences, in particular family dynamics, as well as the strategies employed by parents to mediate their children`s usage of technologies. In total ten family interviews were conducted in Flanders, the Dutch speaking part of Belgium, by two researchers who talked separately with children and their parents in their homes. The interviews were carried out in the period September-October 2014. During each interview at least one child aged 6 or 7 was present, but older and younger siblings, if present, took part as well. In 8 out of 10 families both the mother and the father were interviewed. In two families the children lived with their mothers only, therefore the fathers could not be interviewed.

Family portrait gallery

Alpha Family

Flanders, Belgium

Family members

- Dad, 40, High digital user [B1f]
- Mum, 41, medium digital user [B1m]
- Boy, 6, 1st year of primary school, High digital user [B1b6]
- Girl, 8 months, low digital user [B1g0]

Narrative

B1b6 is a 6-year-old boy who lives with his 40-year old dad, his 41-year old mum and his little 8-months old sister. Both mum and dad are Argentinean, but they have lived for 9 years in Belgium and B1b6 was born in Belgium. They live in a rather big apartment in the suburbs of a university town in Flanders. He started using technologies very young and playing videogames when he was 3 or 4 years old. He can operate several devices on his own, but he must ask for permission before using them.

This 6-year old child and his dad love digital technologies, but mum is not a big fun of technologies and she worries that her son is sometimes too absorbed by them.

B1b6 goes to a Catholic school and, at the moment of the interview, he had just started his first year of primary school. According to his parents he does very well at school. He has several friends there and he enjoys the social and extra-curricular activities organised at school. Mum works as a post-doctoral researcher at a prestigious Belgian university and dad works at his own, small-scale foundation (VZW). Both mum and dad often (have to) work from home. This means that laptops are very prominent in the home. Indeed, at the moment of the interview, both laptops were on the dining table where we held the conversation. Dad also uses his iPhone frequently for work. This is because he works a lot with Latin American institutions so he has to be available for extended hours because of the time difference. B1b is aware of this. In fact, he was one of the few children interviewed in Belgium who also assigned a work-related value to digital technologies. The fact that his parents frequently (have to) work from home has also had an impact on the frequency B1b6 uses digital technologies, especially his dad`s iPad.

B1b6 loves playing games on the iPad. As we could observe during the interview, he plays and uses a wide variety of games and applications including cards games, 3D modelling and even educational games such as a math game. One of his favourite games is "Plants vs. zombies" which he also plays with his dad. He seems very skilled and is able to navigate easily from one screen or App to another without major difficulties. He is also quite aware of some technical and even commercial online risks. For instance, at a certain moment he wanted to show the interviewer how Apps where downloaded into the iPad, but he warned us that we could not look at the code he was typing on the screen because otherwise we *"could steal their money"*. He also mentioned a few times that it was better not to use many games or Apps simultaneously because otherwise the laptop or the iPad becomes too slow.

During the interviews we showed children screenshots of common websites and (online) applications (e.g. e-mail, Facebook, Skype, children`s websites such as Cartoon Network, Ketnet or Nickelodeon, etc.) and asked them to tell us what these images were. B1b6 was one of the few

children in Belgium who was able to recognize several of the screenshots including services or platforms which are not typically used by children of this age such as e-mail or Facebook. Indeed, very few children in our interviews were able to recognize, let alone, explain what communication or social media platforms such as e-mail or Facebook were. B1b6`s knowledge, although not skills, of the digital world is highly mediated by his parents` use of technologies. For instance, as parents often work from home, he knows that e-mails are an important tool for work and that it serves to communicate and exchange work with other people. He is also quite aware of the devices or applications that are used for work, He refers to these spaces/functionalities (e.g. some folders on the iPad or e-mail) as *"important things*" (from dad) which he should not *"touch*". He is also aware of communication or social media tools such as Facebook. Although he is not an active nor a proxy user, he understands the basics of Facebook (e.g. that you can post pictures, or videos) because he has seen his parents use it. As regards communication applications, he knows how to use Skype. He even showed us how to get the App started and select someone to talk to on his dad`s smartphone. Indeed, he uses Skype frequently with his parents because both of them use it to communicate with their families and friends abroad, and specially with B1b6`s grandparents.

B1b6 also likes performing other activities such as reading books or solving puzzles (mainly with mum), going to the swimming pool with dad or practicing other after-school activities such as cycling or lately, playing tennis. He also mentioned that he likes watching TV and going to the cinema. During the interview this family also mentioned that of all the digital things they like doing together the ones they enjoy most are watching TV progammes on the laptop, specially a Spanish-speaking soap opera called "Sres papis".

Even though BE1b6`s daily routine is pretty typical as compared to other Belgian children interviewed, his use of digital technologies is quite intense. For instance, he was one of the few children interviewed who sometimes watches TV in the morning before going to school and, as stated by his mother, he can sometimes spend a long time, even a couple of hours, playing videogames on the iPad, dad`s iPhone or other game consoles or simply watching TV. This may also help explain why his understanding of digital technologies is quite advanced for his age. However his mum also pointed out that "*after watching television for an hour he is bored and he wants to do [other] things with us or with [his] friends".*

The fact that both parents sometimes work from home, but also the fact that they often travel for work, also has an impact on the high frequency with which BE1b6 uses digital technologies. Especially at times when dad is travelling and mum is alone at home, she feels that she is somehow obliged to let him play with the iPad or other game consoles. Even though she doesn`t really like doing this, she sometimes simply has no other choice because she either has to work from home, take care of the baby and/or do household chores.

> *Sometimes [my son] gets bored when we have a deadline, he has to stay alone watching TV or playing with the iPad, but he cannot go outside on his own (….) So I associate the fact that he`s playing with the fact that I cannot pay attention to him…so for me [playing videogames] is not something that we do together.*

For dad, on the contrary, playing videogames or using digital technologies with his son is a personal option he consciously makes because, as mentioned during the interview, he is *"crazy about technologies".* He is, indeed, very positive about digital technologies and he feels very proud that his son has an advanced mastery of these technologies at such a young age.

> *With [dad] it`s different, [dad] chooses to play with him with the PlayStation or with the iPhone. They can play together. I cannot because I don`t like it, so we read a lot together, but if I have to choose between a book and the PlayStation, for me the book is better."*

BE1b6 uses technologies quite often, but practically only after-school hours, during weekends or during holidays. During the week, most of his time is devoted to attending school and school-

related tasks, but after finishing his homework he is allowed to watch TV, use the iPad or play with his or dad`s games consoles.

> *B1m: "[B1b6] also spends time playing alone, not always with [dad]. He has lots of games. He can be one hour playing with the iPhone. Normally he plays every day, but sometimes 30 minutes, sometimes 15 minutes, sometimes an hour, but in the week we don`t have much time because he goes to school and he goes to sleep at 8 PM, The problem is during the weekend or holidays"*

At this home the presence of digital technologies is prominent. Apart from a big flat TV screen connected to a set-top box, a DVD player and a CD player both mum and dad possess laptops. Dad also has an iPhone, a PlayStation 3 and an iPad which he usually shares with his son. Mum has a more modest, but new smartphone and cheap tablet and an e-reader which she does not use very often.

In this family we observed the biggest discrepancy in terms of values attached to digital technologies. In fact, when asked if they would define themselves as a "*technology-minded family"* both replied almost simultaneously *"there is a big difference between us" [and laughed].* Dad even added *"I`m crazy about technologies. I love technologies"* and he showed the interviewer some of the "cool" gadgets he has such as a small beamer for his iPhone. He also explained that he uses some of these devices only with his son because mum is not interested in technologies. Mum, on the contrary explained *"I don`t hate technologies, but I don`t particularly like them. Everything you can see here are [my husband`s] possessions".* During the interview mum frequently emphasized that *she doesn`t hate technologies,* however but she insisted that she doesn`t find them particularly attractive, either. She also emphasized the fact that technology were her husband`s possessions rather than her own: *"I have my own laptop where I work and that`s all".* Interestingly, during the interview dad reminded her that she also had some other devices such as her smartphone or an e-reader but she explained that that she had only recently acquired the phone and only because she was living for a couple of months alone with the baby in USA "*so internet on the phone became necessary*".

When we asked the parents if they actively teach B1b6 about digital technologies or if he learns on his own, mum replied that *"he learns on his own*", however dad indicated that he also actively teaches him some things, for instance, when he achieves difficult levels on games or when he doesn`t know how to get through to the next level. Dad defines his son`s experiences with technologies as very positive. For instance, for school he has learned with the help of some applications because according to him they are *"more interactive (…) it helps to reflect because you get immediate feedback"*. Mum, on the contrary doesn`t associate technologies with learning. She has the feeling that the videogames *"are not really useful"*. She admits that you need to develop certain abilities to play games, but normally she doesn't relate these abilities to intellectual ones because *"in most of the games you have to do the same"*. For her the games are repetitive, but also very absorbing. "[B1b6] *can be absorbed with playing. If you offer him to do something else he thinks that it`s boring. I think that the problem is that the PlayStation, iPad offer too many stimulus. But I don`t think in an apocalyptic way. He also plays with other children and enjoys doing other things. So I don`t associate technologies with something positive, but that`s me.".* In spite of this, mum also recognizes some positive aspects of technologies:

> *B1m: "I think it`s important that [my son] has a fluent relationship with technology. Technology is part of our lives today. I don't think you can avoid technology. I don`t think it`s a good idea to prevent children from using technologies".*

Family Beta

Flanders, Belgium

FIG. 1 KARAOKE VIDEO ON YOUTUBE

Family members

- Mum, 39, low digital user [B2m]
- Boy, 4, preschool, high digital user [B2b4]
- Boy, 8, 3rd year of primary school, high digital user [B2b8]
- Boy, 9, 4th year of primary school, high digital user [B2b9]
- Grandfather, 76, low digital user [B2gf]
- Grandmother, 72, low digital user [B2gm]

Narrative

In this family, the children's digital skills sometimes exceed the digital skills of adult family members.

B2b8 turned eight a couple of days before the interview. He lives together with his two brothers, mum, and grandparents in a medium-sized apartment (with a garden) in the city centre of a university town in Flanders. Mum completed high school and works full-time as an administration officer at a university. They are a single income family but the grandparents are entitled to a state pension. B1m's brother (35) used to live in the apartment as well, but he recently moved out. He still has dinner with the family every day and sometimes picks up the children from school. The family has its roots in China, but B1m and the children grew up in Belgium. The flat is filled with children's toys and objects that reference to Chinese culture. Central to the living room is a flat screen TV with digital set-top box. The family also owns two laptops, of which, one is used by mum (but the children actually believe it is the possession of their uncle) and one by the children. The oldest siblings each have their own tablet. Mum owns a basic cellular phone.

B2b9, B2b8, and B2b4 all go to same school. B2b9 goes to the fourth grade, B2b8 to the third grade, and B2b4 goes to preschool. The children go to after school care and come home around 6PM. At home, mum checks their sons' homework; the family eats together; and afterwards the children get ready for bed (shower, brush their teeth, etc.). Consequently, there is little time to engage in media use on weekdays. Only if the children hurry up, there is time left to watch a cartoon before bedtime. On Saturdays - when the weather is nice - the family tries to engage in an outdoor activity before or after the children go to Chinese class. On Sunday, mum prefers a relaxed day and the family usually stays home. From the moment the boys wake up until noon they are heavily engaged with digital technologies, which creates some personal time for mum. The children usually spend their time before the television screen or on the computer. In the afternoon – after they have finished their Chinese homework – they either play outside or make use of media again.

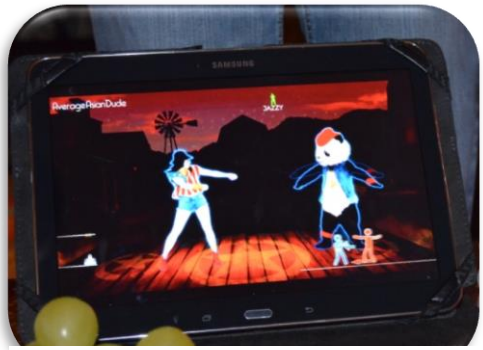

FIGURE 1 CHILDREN PLAYING KARAOKE

Most of the children's interview was conducted with the

three children present. This created the most natural dynamic because the boys often play together according to B1m. This was exemplified during the interview when the children showed us (Karaoke) music videos on YouTube and started singing and dancing together. B2b8 and B2b9 consider the computer and television as the most important devices at home, closely followed by the tablet. Favourite digital activities include playing digital games and watching videos on YouTube. B2b9 and B2b8 occasionally use Google to search for information. B2b4's media time is mainly invested in television or watching/playing along with B2b8 and B2b9.

In contrast to the sons' enthusiasm on digital technologies, mum is a low digital user. She mainly uses a handed-down laptop of her brother to watch Chinese series before she goes to bed. She owns a simple mobile phone and she has little knowledge on how to use the tablets of her sons. She considers herself weary towards using digital technologies in comparison to her children who she considers as more adventurous. Digital technologies are introduced into the family by mum's brother. He has spurred the boys' interest in playing games and watching YouTube videos by first allowing these activities on his tablet and smartphone. The grandparents have little digital skills and their role as regards digital technologies is confined to controlling or limiting the boys' media use whenever they need to engage in a different activity such as dinner or homework.

B2b9 and B2b8 have no problems operating the television/set-top box and can even record (and subsequently watch, rewind, and forward) television programs. They are capable of performing basic and complex activities on tablets and smartphones, such as navigating between screens, starting games, navigating YouTube, and taking and editing photos or videos. They can also take panoramic pictures. Interestingly, B2b9 uses the camera of his tablet to record some of his favourite shows on television, so he can take these with him. To some extent – with exception to B1m's brother – B1b8 and B1b9 are the most skilled family members in terms of operating media devices, especially the tablet. Mum acknowledged several times during the interview that her "*sons' tablet skills supersede [hers]*". B2b4 digital skills are more limited, but he learns from his siblings by modelling their actions.

Mum has ambiguous views about digital technologies. On the one hand, she sees how digital technologies make life easier (e.g. Information at a fingertip, for instance when a family member is unsure about spelling or grammar) and serve educational purposes. She wants her children to keep up with technology as we live in a digital society. On the other hand, she has difficulties keeping up herself, which is exacerbated by the fast-changing and expensive nature of digital technologies.

In general, B1m does not feel the need to intervene too much in her children's media use because she feels they do not have the urge to explore inappropriate content, yet. Nevertheless, she sometimes passes by "*as unnoticeably as possible and check[s] the site the children are on*". In general, adult family members have the power to both terminate children's media use whenever considered excessive and to use media as a reward strategy. For instance, B1b8 needs to do math exercises on the computer for 15 minutes before he can play a non-educational game and grandma interrupted the interview to encourage the children to drink their soup before showing us more content on the tablet. The children themselves did not expressed any concerns about their use of technology.

Family Gamma

Flanders, Belgium

Family members

- Mum, 37, low digital user [B3m]
- Dad, 41, low digital user [B3f]
- Boy, 6,1st year of primary school, low digital user [B3b6]
- Boy, 4, preschool, low digital user [B3b4]

Narrative

B2b6 is a six-year old boy who lives with his 4 year-old brother, his 37-year old mum and 41 year-old dad in a semi-detached house in a relatively small town. The home is located in a dead-end street in a quiet district that houses lots of young families. The boys have lots of neighbourhood friends who can enter the propriety through the back yard. Dad is a factory worker and mum is a teacher. The parents characterize themselves as outdoor people, which is exemplified by the campervan on the driveway. The family owns a television and a set-top box, a DVD/Blu-ray player, a laptop and music devices. Mum owns an old-fashioned cellular phone. Dad has a smartphone, but he only uses its functionalities for checking sport scores and the weather. In fact, the phone is in repair since two weeks and dad contends he "*[has] not missed it at all*".

These outdoor parents do not perceive digital technologies as an added-value. This is why they actively encourage their children to perform activities such as playing outside, practicing sports or playing with friends.

During the week, the children go to school. After school B3b6 does his homework. Afterwards, as an avid football player he goes outside to play whenever possible. Once a week he has soccer practice at a local club. B3b4 is fond of riding his bike after school and going to the playground. When it is raining, the boys love to play board games, a passion they have inherited from their parents. They play relatively complex board games such as Carcassonne and The Settlers of Catan. B3b6 tries to play chess with dad. During the week, the children only watch television before they go to bed and "*only if they haven't played outside for too long*". On weekends, the boys are encouraged to play outside as well or to engage in non-digital activities. B3m, for instance, always gets up with the boys and refuses to use the television as a means to get half an hour of extra sleep. Visiting the grandparents is also a recurrent activity in the weekend.

FIG. 2 THE SETTLERS OF CATAN

The most frequently used medium by the boys is the television. Before bedtime they usually watch cartoons on Nick. Jr for about half an hour. B3b6 starts to have an interest in TV programmes targeting his age, e.g. on Ketnet, a popular Flemish children`s TV channel. On weekends, B3b6 and B3b4 occasionally watch a movie. B3b6 and B3b4 use the computer to play educational (e.g. word-object pairing, word completion) and non-educational digital games (e.g. Sarah's Cooking Class, soccer game). B3b6 also uses the computer for homework. B3b6 and B3b4 aspire to own a tablet, but it does not seem to be a desire that is always on top of their mind. The

parents, for instance, thought B3b6 would ask for a tablet for his birthday, but in the end he opted for a remote controlled car. The family does not own a gaming console, yet B3B6 plays Minecraft at a friends' house. Similar to the boys, B3m and B3f consider the television as the most important device in the house. Mum uses the laptop for work (e.g. course preparation, e-mail) and leisure activities (e.g. Facebook, casual games). Dad only uses the laptop for "*practical stuff*", such as finances, checking the weather or a sports website.

Because either mum or dad sets up the media for their children and because the family does not possess a tablet, the children's digital skills are in general a bit less developed as compared to children observed in high digital families. Nonetheless, B3B6 has developed some specific skills related to his interests. He can, for instance, open a browser (with Google's search engine set as homepage) and type 'spel' [game], after which the link appears of a gaming website. On that website, he can navigate to a soccer game. Although B3b6 and B3b4 have no access to a tablet at home, they recognize a typical home screen (but not a lock screen).

The parents' main motive for restricting their sons' media use is the negative value they attach to screen time as compared to other activities such as playing outside, playing board games, etc.:

> *B3f: It's about what they miss out. At the moment you are doing that [sitting in front of a screen] you can't do anything. You can't get bored; you can't play; you miss out social contacts. Those are things you can't do 'alone alone'.*

In addition, B3f feels that their point of view is acknowledged by experts. He watches a lot of "*information programs in which scientists contend that young children who spend too much time watching television or using a computer have troubles later on to concentrate, to connect socially,* ...". Specifically with regard to tablet use, B3f mainly emphasizes potential negative consequences and downplays possible educational values. He fears, for instance, that learning to write on a tablet is essentially different from writing on paper. B3m nuances that tablets can support learning and that different learning strategies can be combined.

B3m and B3f mainly turn to restrictive parental mediation strategies. They perceive little need to discuss content because the children *"only see what we want them to see*" and can already – to some extent – set boundaries themselves. For instance, B3B6 does not want to watch The Lion King' anymore because he found a particular scene too scary. Nevertheless, although B3m and B3f control what media content their boys are exposed to at home, they know little about their sons' media use outside the home. B3m for instance said that B3b6 plays Warcraft (a 18+ rated game) at a friends' house. However, during the debriefing it became clear that B3b6 plays Minecraft and not Warcraft. In any case, neither B3m nor B3f had an idea about what the game was about. They were confident that the parents of B3b6's friend would not let their son engage with games not appropriate for their age. Another important family rule is that the children need to agree when using digital technologies and whenever they fight, B3m or B3f stop the activity.

Family Delta

Flanders, Belgium

Family members

- Dad, 34, medium digital user [B4f]
- Mum, 35, medium digital user [B4m]
- Girl, 7, medium digital user [B4g7]
- Boy, 4, medium digital user [B4b4]
- Girl, 4, medium digital user [B4g4]

Narrative

The family lives in an urban area in a row house with a garden in one the suburbs of a large city in Flanders. The living area is filled with a variety of toys, such as Playmobil toys, dolls, books, modelling material, etc. Both parents have completed college education. Dad is a copywriter for a governmental organization and mum teaches Dutch to foreigners. Mum is half Flemish and half American and she mainly speaks English with the children. In the past years, B4m has been a working student. She will receive her master's degree in Educational Sciences in January 2015. In addition, she is active as a politician, representing a left-wing party at the local policy level. Because of work, the pursuit of a master's degree, a political mandate, and their three children, including twins, B4f and B4m perceive their life as very hectic, *"although it is getting better as the twins get older"*. The family owns a television (but has no cable subscription), two laptops, a tablet (extra-legal benefit as a politician), multiple MP3 players, and a kids computer. Both parents make use of iPhones. The family possesses cultural and economic capital.

In this family the parents are strongly involved in their children's media use because they feel children need guidance while interacting with media and because they fear children might break expensive devices.

During the week, days are packed. In the morning children get dressed, eat breakfast and go to school. As both parents work full-time, children go to after school care. The family arrives home between 6pm and 6.30pm after which the children occupy themselves by doing homework or non-digital activities. After dinner, children get ready for bed. Bedtime is around 7.30pm. In the weekend, life is not as frantic. There is time for grocery shopping, going to the playground or visiting grandparents. On Sunday, B4g7 goes to the youth movement by bike (6km) together with dad.

As regards the use of digital technologies, mum and dad both need computers professionally. At home, they use digital devices for work purposes (e.g. e-mail, course preparations, etc.) and leisure activities (e.g. browsing news sites, watching television series, etc.). Dad considers television an "*outdated technology because [he] can easily find the same shows on the Internet*". Both mum and dad prefer using media according to their time schedule and preferences. Although the children genuinely enjoy digital technologies such as watching television programmes or playing digital games, they are not very engaged in digital activities because there is just no time on weekdays. The children like almost all activities presented to them. When asked to pick their top three favourite activities, B4g7 chose Playmobil, swimming and playing digital

FIG. 3 ENJOYABLE ACTIVITIES ACCORDING TO B4G7

games such as Angry Birds on the iPad; B4b4 talked about dolls and the computer; B4g4 did not enjoy the card game and wandered off to play with Playmobil or to read a book. Because of her young age and because it proved to be very challenging to keep 3 young children`s attention and focus, the interviewer let her engage and disengage from the interview as she wished.

On weekends, the parents prefer to keep digital devices for moments when they cannot engage in their children's activities. The children then browse YouTube or play casual games on the iPad. At their grandparents' house they usually watch a movie. About once a month, mum uses "corners", which means that every child engages in a different activity for a certain amount of time and when the time goes off, they rotate and move on to the next activity until each of them has performed the three activities. For instance, one child goes to the tablet 'corner' and uses the tablet to watch YouTube videos or to play a Lego game while another child plays with plasticine and one child sits with mum at the computer. Mom sits together with the child using the computer because it is the most challenging medium to work with, especially because the children need to use the track pad since there is no computer mouse available. They use the computer for educational games.

The children have little understanding of online activities or applications, such as Google, Facebook, or e-mail. The children know Skype because they use it "*to share [their] feelings*" with relatives living in the USA. We observed large differences in terms of B4g7`s knowledge and digital skills as compared to the younger twins. B4g7 already has a much more "abstract understanding" of digital technologies and how they work. She can, for instance, browse through different menus on the tablet independently, while the twins need help to perform basic activities such as going back to the previous screen when a YouTube video finishes. The children do not know the password of the tablet or smartphones, but B4g7 knows you do not need it to take pictures. The children are taught how games must be played and mum or dad usually stay nearby because "*the children in general don't have much respect for physical things yet*". The children themselves did not identify any risks associated with digital technologies. However, B4g7 mentioned that she did not enjoy commercial content nor *silly videos*.

> *Interviewer: Have you or has a friend or anybody you know ever seen something that is not so nice on the computer. Or is it always nice and fun on the computer?*
>
> *B4g7: On the computer sometimes we look big people, and we don't like it*
>
> *Interviewer: And why don't you like when you see big people on the computer?*
>
> *B4g7: Big people we don`t like because they…because big people they are not interesting for children because they only say things about things that you can buy in a store. Or sometimes they put silly films on computer, like this.*

B4f and B4m identify both opportunities and risks related to digital technologies. On the one hand they acknowledge how digital devices make life easier and are an indispensable part of modern life. On the other hand they fear that digital devices can be very time-consuming and addictive because of the instant gratification they offer. B4m, therefore, wants her children to prioritize other skills first, such as being able to play socially offline. B4m is scared that she may not be able to keep up with the fast-evolving nature of digital technologies. One of the reasons why she purchased a smartphone was to remain up-to-date with digital technologies that her children would appropriate in the future.

In this family there are no strict rules regarding the use of digital technologies. Whether and when the children can use digital technologies at home mainly depends on whether there is time. The children are nevertheless strongly encouraged to pursue non-digital activities. The parents are strongly involved in their children's media use because they feel children need guidance while interacting with media and because they fear children might break expensive devices. The parents usually choose and set up the media and its content, especially for B4g4 and B4b4. The children are in general compliant, but sometimes they "*go into hysteria*" when they are asked to

put down a digital device. The parents therefore use a “time-timer” to allow the children to visualize the time that is left to spend on the activity. B4m and B4f are adamant that media literacy for children should be a combined effort of both parents and the school. The parents would welcome initiatives for a platform that lists safe apps and that is kept up to date.

Family Epsilum

Flanders, Belgium

Family members

- Dad, unknown, low digital user [B5f]
- Mum, unknown, low digital user [B5m]
- Boy, 6, 1st year of primary school, medium digital user [B5b6]

Narrative

B5b6 is a 6-year old only child who lives with his dad and mum in the Flemish part of Belgium. Both his parents are Asian, but they have lived for several years in Belgium. As a matter of fact, B5b6 was born in Belgium. They live in a medium-sized apartment with a garden. At the moment of the interview, B5b6 had just started his first year of primary school. He knows B1b6 quite well because they used to be school classmates. Once in a while they get together to play.

The interview was conducted in Dutch. However, as this was the second language of the family, at times, this hindered a fluent communication.

A general low (digital) literacy level characterizes this family which seems to contribute to a higher exposure to some risky (online) experiences by this 6-year old boy.

At home this family possesses a TV, a laptop, a PlayStation2 and a tablet. B5b6 uses all the digital artefacts that are present at home. He even possesses his own tablet. Unfortunately, at the time of the interview the tablet battery had not been charged so we could not observe him using it. His parents also have a smartphone where he can play and download games. During the interview we showed him pictures of digital and non-digital devices, games and activities and we asked him to classify the pictures according to the things he liked a lot, the things he liked a bit and the ones he did not like. Of all the pictures, B5b6 chose the PlayStation Portable (believing it was a Nintendo DS), the MP3 player, tablet, and game console as the ones he liked most. Interestingly, he does not have a Nintendo DS, however his friend B1b6 does. They have played together with it and this is why, according to him, he would like to have one, too. Indeed, during the interview he spontaneously made a drawing of the Nintendo DS and, as he gained more confidence, he asked the interviewer if he could keep the card displaying the portable gaming device. He promised that he would return the card to us as soon as he gets a real Nintendo, normally on his next birthday, as promised by his parents.

As regards his favourite activities, B5b6 watches Rox, a Flemish TV series for children, on TV as well as searches for movie clips of the show on the Internet. He also likes to play games, including fighting ones, on the PlayStation2, on his tablet and on his father`s smartphone, where he is also allowed to download (free) games. Interestingly, at his young age and in spite of never having learned English, he already knows the meaning of words such as “free” or “download”. His parents also mentioned that he likes to watch Mister Bean on TV, but B5b6 said that he didn`t really like it. As regards, digital skills, B5b6 can turn on

the PlayStation, but he is not able to start games without his parents` help. During the interview, however, the family did not succeed in making the PlayStation work until one of the researchers helped them to get started. He can also use Skype on his own but only if one of his parents opens the programme for him. He can turn the TV on and change channels and he can play and download videogames, mainly on his tablet and on his dad`s telephone. Apart from digital technologies, B5b6 has other hobbies. For instance he goes to dancing school and he likes playing football. His parents also said that he frequently watches Kung Fu videos online, and that afterwards he imitates what he has watched. Probably because of his passion for football he also enjoys playing FIFA games on the PlayStation2.

B5b6`s online searching skills are rather limited. This is probably because he is just starting to read and write at school which limits his searching capabilities to short and simple terms such as "Rox" (one of his favourite Flemish TV programmes). Nevertheless, as observed during the interview, he sometimes also succeeds in finding more complex information with the help of the autocomplete feature of some search engines. This process, however, is less straightforward as it requires him to check and visit a few websites, usually the first ones suggested by the engine, before finding the desired website. This trial and error process is not exempt from risks. On the contrary, because most of the devices he uses to connect to the internet are family devices which are also employed by his parents, the possibility that he encounters commercial or other types of online content not meant for children or directly targeting an adult audience are high. This potential risk is illustrated by the pictures below which were taken while B5b6 was showing us how he typically used the internet on his dad`s laptop.

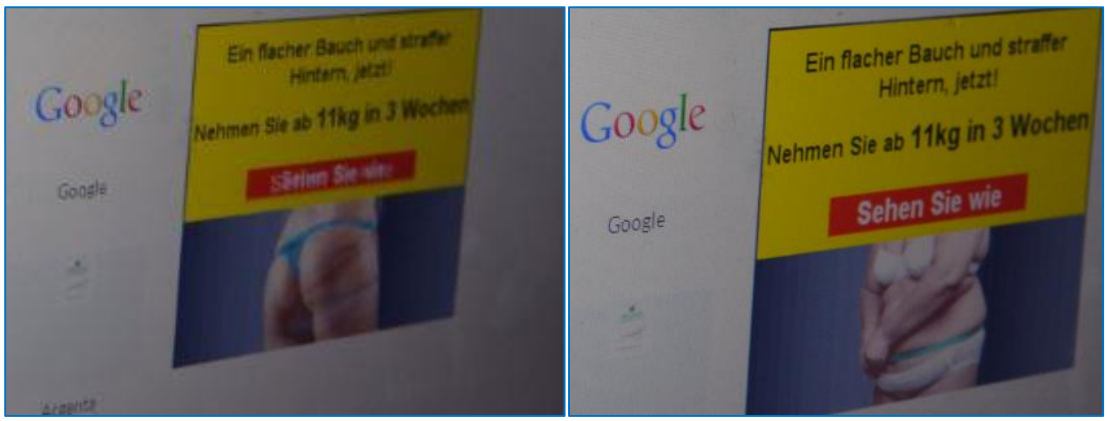

FIG. 4 PICTURES TAKEN WHILE 6-YEAR OLD CHILD BROWSES FOR INFORMATION ON HIS FATHER`S LAPTOP

Even though B5b6 gets some help from his parents to use the computer or the PlayStation it is also apparent form the interview that he learns a lot on his own, but also from his friends and from the school. His parents do not seem very knowledgeable nor aware of digital technologies and potential associated risks. For instance, this is the only family where none of the parents uses e-mail, so all our communication with them before the interview had to be done via the telephone. Probably because of their rather low digital literacy level, B5b6`s parents are also less aware of potential online risks and let their son explore the digital world quite freely. In spite of this, they do set time limits as regards the use of digital technologies. For instance, they do not let him spend more than 1 or 2 hours a day in front of screens because they disapprove of excessive computer use. They also have strict rules as

regards when it is possible to play computer games, for instance, not before doing his homework. According to his parents, B5b6 is obedient and follows these rules. In spite of being rather strict about the time spent with digital technologies, B5b6`s parents, especially the father, admit that technologies can also be educational because they can help children learn new things. They also value the fact that he has computer classes at school.
When asked if B5b6 has ever been confronted with negative experiences, B5b6 expressed no concerns at all. His parents only referred to the fact that when playing B5b6 uses sometimes *"dirty words",* but he clarified that these words are learnt at school, via his friends, rather than through the use of specific media. In sum, apart from the use of inappropriate language and excessive time exposure to technologies, no other worries or concerns related to digital technologies were expressed by this family. Still, as explained above, we were able to observe B5b6`s exposure to potential online risks.

As opposed to B5b6`s parents, digital technologies play a prominent, although not exclusive, role in his life. He uses them mainly as a way to relax and have fun, but he also learns things from their use, for example Kung Fu moves. For his parents, on the contrary, digital media use is much more limited. They mainly watch TV and use their laptop or smartphone to be informed about the news and to keep in touch with their family abroad. The family watches a Dutch soap opera together. Besides its entertainment, the parents explain that the relatively simple vocabulary is excellently suited to improve their Dutch. Interestingly, in spite of being low digital parents, they encourage their son to use digital technologies because they believe that through them he will be able to learn more. Finally, no conflicts nor tensions were observed as regards the use of digital technologies at home. There are only a few rules in place especially related to time, and everybody respects them.

Family Zeta

Flanders, Belgium

Family members

- Dad, 41, medium digital user [B6f]
- Mum, 37, medium digital user [B6m]
- Girl, 6, 1st year of primary school, high digital user [B6g6]
- Boy, 2, low digital user [B6b2]

Narrative

B6g6 is a 6-year-old girl who lives with her mother, her father and her 2 year-old brother. At the moment of the interview both parents and B6g6 were present. The little brother was at the day care centre. They live in big house with a very big garden in a residential area. Mum and dad own a shop and they work there almost every day including Saturdays and, sometimes, Sundays before noon. Because of their busy schedule, the children usually go to the shop after school or sometimes they go to their grandparents` house, also in the weekend, if necessary. At the shop they have a dedicated and nicely furnished room for them where they can do their homework, eat, watch TV and relax. Because of their constant mobility the family iPad has become an important entertainment gadget for B6g6. Both sister and brother have lots of toys and digital technologies to play with both at home and at their parents` shop.

Because of this family`s constant mobility the iPad has become an important entertainment gadget for their 6-year old daughter.

At home B6g6 mainly uses the TV, the iPad and the laptop. Indeed, during the interview she mentioned that the TV was her favourite technological device and she watches TV more than other children we observed. She is one of the few children interviewed who is allowed to watch TV in the morning before going to school. She can use the TV on her own and is able to swap between channels and chose the ones she likes. Because they have digital TV at home, she is also able and allowed to order free movies. For paid movies she needs to ask her mum for the password. Apart from the TV, she likes the iPad a lot. Not surprisingly, she mainly uses the iPad and the laptop to watch films on YouTube, but also to play games. In particular, she likes watching films from the movie "Frozen" as well as other "*funny*" films, for instance, about animals doing "*silly*" things. At home they also have a Nintendo DS which she uses to play games (e.g. Super Mario bros.). She also mentioned that she doesn`t possess a smartphone, but that she would like to have one of her own because one can play lots of games there as her dad does. She is sometimes allowed to use her mum`s phone to play. Her dad does not let her use his smartphone very often because when she was a little child she was playing with it and it fell so it almost broke.

As observed during the interview, she can use the iPad quite independently. She is able to navigate from one screen to another, to open applications, to go back to the main menu, etc. and even to download free Apps. During the interview, B6g6 explained to us how she had downloaded the free app "Taking Tom":

Interviewer: What do you do if you want to play a new game [on the iPad]?

B6g6: When I found the dog [referring to the "Talking Ben" App], there was something like this [pointing to an ad] and when I clicked there it was this game [referring to the "Talking Tom" App]
Interviewer: So, you first found the dog and then, you clicked somewhere on the dog game and so you found Tom [meaning the "Talking Tom" app]?
B6g6: Yes. Do you see? Like this [pointing at the "free" cat icon (Tom) on the upper right corner of the "Talking Ben" screen]
Interviewer: Ah, where it says "free"
B6g6: That is a kitty and there I clicked and then I got this game.

FIG. 5 A 6 YEAR-OLD CHILD SHOWING US HOW TO DOWNLOAD A FREE APP ON THE IPAD

Her parents confirmed during the interview that B6g6 is able to find games on her own. However, her mother explained that she cannot simply download Apps to the iPad because first she must type in a password which she does not know.

B6g6 is also aware of some technical risks:

B6g6: *You must not click there (pointing to a banner with an advertisement on her iPad), because you can find something dangerous.*
B6g6: Something dangerous?
B6g6: Yes, and then the iPad won`t work

For paid games she needs to ask for her parents` password. If she wants to watch videos or a movie on YouTube her parents have to help her to type the name of the film. Once this has happened she simply continues clicking on the videos suggested by YouTube. As observed during the interview, her selection of videos is simply based on what, at first sight, seems funny. Sometimes she also recognizes videos that she has watched before and she clicks on them because she knows those are funny. According to her parents, she finds it difficult to use the mouse and they believe that she can deal much better and faster with the touch screen. Apart from using technologies, B6g6 likes drawing, playing with dolls, reading books, going to the playground and to the swimming pool. She also goes to dance classes.

As most children interviewed B6g6 has learnt to deal with technologies in a very intuitive way via a "trial and error" process. The only formal learning process mentioned during the

interview was the use of smart- or digi-boards at school. Apart from that, her parents believe that she is very fast at learning to deal with technologies, especially the iPad which she commands quite well. It is quite likely that she also learns by observing others engage with technologies (e.g. her parents, other relatives and probably friends) as well as by trying on her own.

B6g6`s digital skills and knowledge are rather broad as compared to other children of her age. However, as observed with the other Belgian children interviewed, her digital skills and literacy level are still quite limited in the sense that she is only able to use a reduced set of functionalities, mainly watching (and finding) videos on YouTube and playing games. Her level of awareness of potential (online) risks is almost inexistent with the exception of an incipient knowledge of technical and commercial risks. She is, in fact, still unable to recognize many, probably most, of the icons on the home screen (e.g. e-mail, Skype and other communication or social media apps, etc.). B6g6 seems to enjoy technologies quite a lot and she did not express any fears of concerns related to her experiences with technologies. Her parents do not express any concerns either and they do not think that her daughter has been confronted with any unpleasant experiences online. The mother mentioned, however, that she is worried about the future, for instance, when her daughter grows up and starts using Facebook or Instagram. She knows some girls (e.g. friends' daughters) who post pictures which she believe are not really appropriate for their young age or who send and accept friend`s requests from people they do not know. In particular she worries about social media and this is why she believes that children should be made more aware of the things they should be careful about online.

B6g6`s parents spend a considerable amount of time with digital technologies. Both of them have an iPhone, but they do not use them intensively. B6g6`s mother manly plays games such as Candy Crush on the iPad, she uses Facebook and she reads the newspaper. The father mainly checks his e-mail and looks for second had cars which is his passion. In this family the parents mainly perceive digital technologies as useful for work, to be updated form the news, but also as a useful tool that helps "entertain" their children when they are both working at the shop, but in general they, as a family also spend considerable time doing things that are not technology-related such as biking or going out.

In terms of family rules, there aren`t really many nor strict rules when it comes to using digital technologies at home. The only concrete rule mentioned during the interview was that B6g6 is not allowed to know the code of the App store nor of the digicorder (set-top box). By doing this she is prevented from downloading games or Apps onto the iPad and her mother`s iPhone and she cannot rent paid movies on her own. Her parents believe this measure is effective because it allows them to be informed about and to control what her daughter does online or the TV content she is exposed to.

Family Eta

Flanders, Belgium

Family members

- Mum, 34, medium digital user [B7m]
- Dad, 31, high digital user [B7f]
- Boy, 7, 2nd year of primary school, medium digital user [B7b7]
- Boy, 4, preschool, medium digital user [B7b4]

Narrative

In this family digital technologies are seen as useful, for school for instance. But parents also think that their use should be restricted and that parents should control what their kids do.

These 4- and 7-year old boys live with their mother and father in a row house with garden in a relatively small town about 15 minutes from a large city in Flanders. Their living room is filled with (digital) toys, but also DVDs and dad`s comic books collection. The father completed high school and is a store manager of a discount supermarket. The mother has a bachelor degree and works as a midwife in a regional hospital. We observed a lot of technologies at the home, including multiple televisions, a DVD/Blu-ray player, an advanced Dolby Surround system, a desktop computer, a laptop, a tablet, music players, smartphones, multiple V-Tech kids computers, a Wii gaming console, and a Nintendo DS. As a DJ and technology enthusiast, dad follows the latest technological trends. He owns DJ devices and installed a home network so that media content can be accessed in all rooms.

During the week B7b7 and B7b4 go to school. After school, there is time for homework and mostly non-digital leisure activities, such as playing outside, riding their bike, reading (B7b7) or playing with friends at the nearby playground. School requires B7b7 to read at least 10 minutes a day. Sometimes the boys watch television while mum is cooking (and dad is still at work). Before bedtime, B7m and B7f allow their sons to watch television because *it calms them down*. On weekends, the boys engage in a variety of non-digital and digital activities. B7b7 and B7b4 enjoy watching television and playing games on the Nintendo DS, Wii, or smartphone. When mum and dad have to work on Saturday, they play on the Wii with the babysitter. At home, mum uses digital devices to relax (e.g. watching television, social media, etc.). Dad is passionate about music, but also watches television and uses the Internet to inform himself before making significant purchases.

In this family, the parents mainly choose and set up the media and its content for their children. The focus is usually on television or digital gaming on the Nintendo DS or Wii. It is only very recently that B7b7 is allowed to operate the television and Nintendo DS on his own. He cannot operate the Wii or DVD-player. B7b4 can only operate the Nintendo DS independently. The children are only occasionally allowed to play with the tablet or

smartphone because the parents fear that the boys might break these expensive devices. As a result, in comparison to other children interviewed, these boys have relatively low digital skills related to touch screen devices. They also seem unfamiliar with applications such as Skype, the camera, or YouTube. B7b7, however, knows that Google serves as a portal to go to other websites, such as the school's digital platform.

FIG. 6 B7B7 PLAYS MARIO KART ON THE WII

In general, the parents consider digital media as "*a surplus*"; they want their children to acquire other skills first. Not all digital technologies are considered equal. B7f perceives little value in watching television and considers it a rather brainless activity. B7m nuances this point of view by adding that "*television programmes now are more complex*" than two decades ago and emphasizes that interactive television programmes such as Dora the Explorer require at least some cognitive effort. Dad – a former game enthusiast himself - nevertheless prefers that his sons play digital games instead, because at least gaming has a positive effect on hand-eye coordination. B7f wanted to show the effect of gaming on hand-eye coordination by letting the interviewer race against B7b7 in Mario Kart. The interviewer, a gamer himself, lost the race. Both parents acknowledge the potential opportunities (e.g. information value) and dangers (e.g. privacy) related to using the World Wide Web, but their children's Internet use is mainly limited to the B7b7's digital school platform. In general, digital technologies are not often used for family bonding. Occasionally, when the boys behaved during the week, the family eats pizza together while watching a movie.

As a result of their ambivalent perceptions of digital technologies, parents have introduced rules for technology use. The most important rule relates to access. The boys can only use digital technologies if they have permission and most often mum or dad sets up the media. The television and gaming consoles can, in general, be used without the explicit supervision of mum or dad, but expensive or less user-friendly devices such as the tablet, computer and smartphone must be used together with a parent. Because dad is not always home for dinner, he does not let the children use digital devices at the table (although he sometimes breaks this rule himself).

Theta Family

Flanders, Belgium

Family members

- Mum, 37, low digital user [B8m]
- Girl, 7, 2nd year of primary school, medium digital user [B8g7]
- Girl, 4, preschool, low digital user [B8g4]

Narrative

B8g7 is a seven-year old girl who lives with her 37-year old mum and her four-year old sister in a small terraced house in the outskirts of a large city in Flanders. The ground floor of the house is open plan and houses a lot of toys and drawing material. Mum has completed college education and has two part time jobs. Her main occupation is physiotherapist. The family is characterized by high cultural but low economic capital. Mum worked for a non-profit developmental aid organization in Namibia where she met the father of B8g7 and B8g4. The father still lives in Namibia, but B8m has contact with him on a weekly basis via e-mail. The children seldom speak with dad because the family does not have an Internet connection at home and because of the language barrier. Mum, however, encourages dad to send postcards which make B8g7 and B8g4 very happy. As a single mother, B8m welcomes help of her parents. On Tuesdays, B8m works late. Her parents pick the children up from school and they stay there for the night. At least on one other day in the week, the family visits the grandmother (B8gm) and the grandfather (B8gf). B8g7 and B8g4 enjoy these visits very much amongst other reasons because of the presence of cable television and an up-to-date computer.

Despite having almost no access to technological devices at home (because of economic constraints and mum`s rather negative views on technology), the oldest 7-year old sister in this family has quite advanced digital knowledge and skills.

The family owns an old CRT television but no cable subscription, a DVD-player, and a "*very slow computer that is unable to connect to the Internet*". Mum does not possess a smartphone, but an old-fashioned Nokia mobile phone. At home children's media use is limited to watching DVDs which they rent from the public library. During the week, B8g7 and B8g4 take turns in choosing one or two short videos to watch before going to bed. Occasionally, mum puts on a DVD when they are very tired after school and she needs to cook. On weekends the children sometimes watch a DVD in the morning while mum sleeps for an extra half an hour or goes to the bakery (which is about five minutes from their house). The weekend is packed with activities. B8g7 is engaged in rope skipping, goes to the local youth movement and occasionally goes to birthday parties.

FIG. 7 SELECTION OF DVDS CHILDREN WATCH

B8g4 goes to 'Multi-move' classes in which she gets familiarized with different sports. The whole family does the shopping and they usually visit B8gm and B8gf.

B8g7 and B8g4 talk enthusiastically about a variety of technological devices, in particular the tablet and an up-to-date computer. B8g7 plans "*to buy an iPad when she's taller*". Despite having little access to the latest technological devices at home and mum's digital use is low, B8g7 is among the most knowledgeable and skilled children as regards digital technologies we interviewed. She is familiarized with cable TV because she can watch it once or twice a week at her grandparents' house, she also has computer class at school, and she plays on iPad with a friend or with her older cousin. She is also aware of the different functions of a smartphone, can make use of Google as well as explain the functionality of Skype and even Facebook, which very few children knew. B8g4's media reality is centred around the television, but she also loved to play games on a kids computer which sadly broke down. The girls did not mention any negative experiences with media during the interview, however B8g7 indicated that she did not like games in which "*you have to shoot characters or light them on fire*" which may indicate some exposure to violent content. B8g7 finds it unfortunate that digital devices are expensive because she aspires to own an iPad and an up-to- date computer to do her homework but she is aware that they cannot afford it, yet.

B8m seldom uses media at home, with the exception of occasionally watching a news program using an antenna that allows her to capture two stations of the public broadcasting service. The antenna is so loud however that she needs to make use of subtitles. Mum's reluctance to buy more digital devices can be attributed to financial constraints – "*there is just no budget at the moment*" – and to her negative perceptions of digital technologies. As a physiotherapist she complaints about the sedentary nature of technology use and she does not associate digital devices with social or "*cosy activities*". B8m sees benefits in educational programs on television such as Karrewiet and in some educational games for intellectual development, but she doesn't "*think [her] children are more stupid in comparison to their peers just because they don't have an iPad or a computer*". Instead, she believes that her children "*are flexible enough to catch up later*". Despite dominant negative perceptions B8m feels that she "*will need to succumb one day [to buying a new computer]*" because the children will need a computer for school purposes. At the moment, B8g7's school already makes use of a digital platform for additional exercises, but the school is thinking of installing a similar platform for mandatory homework as well.

B8m uses both constructive and restrictive parental mediation strategies. She believes these strategies will become more important when her daughters are older. B8g7, for instance, chooses children's DVD in the library as her reading skills are not developed sufficiently to read subtitles at the required pace. The children can only watch one or two movies a day before bedtime, but exceptions are possible in the weekend or when the children are very tired. Mom either chooses DVDs in the library herself or she checks the choices her children have made. The grandparents impose less temporal limits. Whenever something scary happens, in a Disney movie for instance, mum discusses the event. As the media use takes place in the open-plan ground floor, mum always has an eye on her children.

Iota family

Flanders, Belgium

Family members (interviewed)

- Mum, 30, low digital user [B9m]
- Step father, 50, medium digital user [B9f]
- Girl, 5, preschool, medium digital user [B9g5]
- Girl, 7, 1st year of primary school, medium digital user [B9g7]

Stepsiblings not present during the interview

- Girl, 10 [B9g10]
- Boy, 10 [B9b10]
- Boy, 15 [B9b15]
- Male youngster, 19 [B9b19]

Narrative

B9g5 and B9g7 are the youngest sisters of this stepfamily with seven children. They live with their 50-year old stepfather and their 30-year old mum. They have four other (step) siblings, but, only three of them live at home with them. During the interview the children mentioned that their 15-year old brother lives at a boarding school. This low income family was the only family in Belgium who chose to be interviewed at the after-school day-care the 2 girls interviewed attend rather than at their home.

Even though the parents in this family feel that their youngest children`s online experiences are quite safe and let them explore digital technologies freely, these 5- and 7-year old girls have been confronted with rather unpleasant, and possibly risky, online experiences their parents are unaware of.

In spite of their low socio-economic status this family possesses lots of technologies at home, including two TV sets, a PlayStation3 and a Nintendo Wii. Except for the TV and the games consoles, there are not many family devices. On the contrary, most devices are either the children`s or the parents`. The latter cannot be used by the children. The parents own very modern and expensive smartphones as well as a laptop. The mother owns her own tablet. The children have their own computer which they share. However, as described by the parents and the children themselves, this computer is old and slow, so the children use it mainly to play online games. Older siblings in this family own their own cell phone and the 15-year old brother has his own smartphone, tablet and laptop which he got from his grandmother. B9g5 and B9g7 have "inherited" their older siblings` old cell phones. They use them to play games but they cannot use them to make phone calls because they, purposefully, are not equipped with a SIM card.

Both B9g5 and B9g7 enjoy watching TV as well as playing with the computer and the PlayStation. They also mentioned that they liked the tablet, however they are not allowed to use it. The mother explained that the children broke the previous family tablet so they are

forbidden from using the new one. Regarding their online activities, these two girls usually visit the gaming websites www.spelen.nl and www.funnygames.nl. On the TV they usually watch the Nickelodeon Junior channel and TV programmes such as Hot Wheels, Chica Vampiro, a Colombian teenagers TV series, and Sam and Cat. They also play fighting and car racing games on the PlayStation. Even though the family has a Nintendo Wii console the children did not mention it during the interview. The parents confirmed that it was not really used.

According to their mother and stepfather, these two little sisters have acquired a number of digital skills by observing older family members use them, but depending on the activity they engage in, they sometimes need an older sibling or their parent`s help. Both girls can find their favourite TV channels, go to online gaming sites on their own and play computer games on the PlayStation. In the specific case of B9g5, she has learnt to use the tablet with her foster family so she can also find and take pictures with the tablet and also play games and watch videos there. The mother emphasized that in general, their children know much more about technologies than she does.

Apparently, B9g7 and B9g5 do not have any specific hobbies apart from watching TV very intensely and playing online computer games. As their mother indicated during the interview, the TV is always on at home, even as background when they are having dinner or in the morning when the children get ready to go to school. The mother also explained that the youngest daughter is more active and she prefers playing online games on the computer, while the older, and quieter sister prefers watching TV. This distinction was not really evident during the children`s interview. Indeed, when asked which activities, toys and devices they liked most, both sisters mainly chose technological devices. This was particularly noticeable in the case of B9g7 who placed traditional games and activities such as Legos, books and even the playground among the things she did not like. Dolls and the swimming pool were the only non-digital devices she placed among the things she liked most. Her youngest sister favourite options were more diverse and she did place the playground, Legos and riding her bike among the things she enjoyed a lot together with several technological devices such as the TV, computer tablet, MP3 player, smartphones, etc. Interestingly, this is the second family where we observe that the oldest sibling chooses the PlayStation as a favourite device while the youngest one does not. We believe that the PlayStation, and other similar controller-directed game consoles, are too difficult for younger children (aged 5 or below) to use and this is why they do not like them.

In general, these two girls perceive digital technologies as something positive. They enjoy using technological devices for different purposes, for instance for listening to music, watching series or videos or to play videogames. Their step-father also has quite a positive view of digital technologies. He thinks that these are important tools that have facilitated many aspects of everyday life, for instance, communication is much faster thanks to services such as the e-mail, or you can organize lots of information in your computer and find what you need quickly and easily. He also refers to very practical uses of technology such as withdrawing money from bank machines, as well as to entertainment aspects such as gaming. In spite of this he worries a bit about the future and the extent to which technologies may replace human beings, for instance in construction work, which he currently performs. He also expresses some concerns as regards the digital divide because he feels that more and more people are pushed towards using technologies, however not everybody is prepared or has the necessary skills to deal with them and this can cause problems: *'if you are looking for a job in ten years, it will be something with technologies'*. The girls` mother, on the contrary,

has a negative vision of digital technologies and media. She summarizes her views by saying that technologies '*make people stupid (…) and lazy',* but also *anti-social*. In spite of this, she believes that it is important that children use technologies as much as possible '*because the world advances too fast'* and they need to be able to catch up.

The mother and the stepfather in this family do not seem worried about their youngest children`s use of digital technologies (B9g5 and B9g7), however they do express considerable concerns about their older children and, in particular, their 15-yearl old boy, who, according to them, uses technologies excessively and has had some bad experiences online.

B9m: With the 15-year old boy we don`t have any control about what he does [online].

B9f: And we`ve already had a bad experience with him. With those 'special' sites.

This 15-year-old boy is also the child within this family who possess more mobile technological devices. The parents explain that by keeping the old computer in the living room they are able to "keep an eye" on their youngest daughters' internet use, however this approach is ineffective with their 15-year old who possess his own laptop, smartphone and tablet, all given to him by his grandmother. When asked about existing rules at home, both parents mentioned that they do not have any and that they let their children use these technologies as free as they want. However, they did mention that there are obvious time limits, for instance, they can only use technologies in their free time, after having dinner and before going to bed which means less than an hour during week days. They also mentioned that they keep an eye in what they do, and that because they discovered their 15-year old son visiting websites which were not really *appropriate* for children of his age, they set up Google in such a way that they are now able to trace from their own tablet and smartphones the history of everybody who searches the internet at home. By doing this they can control somehow what their children do online and take some actions if deemed necessary. Interestingly, as the extract below shows, even though the parents in this family feel that their youngest children`s online experiences are quite safe, the interview with the children showed that they have been confronted with less pleasant, and possibly risky online experiences, particularly having seen images of naked women online and having the intention to contact a "*beautiful lady*" they did not know in person once.

B9g7: [my 15-year old brother] always looks at pictures of pretty girls

Interviewer: And you look at those pictures with him?

B9g5: Real naked women and so, that's what he looks at. To see if he can get a girlfriend

Interviewer: Ah, ok. And those are really naked women? What do you mean by that?

B9g7 They sometimes wear a bra and panties and sometimes they are completely naked.

(…)

Interviewer: And are these ladies pretty?

B9g5 and B9g7: No, ugly!

Interviewer: And what did you think about seeing these naked women?

B9g7: But one of the naked ladies was pretty, I thought.

(…)

Interviewer: And the others? You didn`t find them pretty?

B9g7: No, but once I also saw a very pretty lady with clothes and that. And I found her pretty to become my friend. But I didn`t tell anyone about it. I didn't want to.

Interviewer: So you wanted to become friends with the lady?

B9g7: [nodding] I kept it to myself

Interviewer: And did you get in touch with the lady?

B9g7: What do you mean?

Interviewer: Did you talk to her or send her a message?

B9g7: But I`ve never seen her! I never see her. I live in [name of town] and I don't know where she lives.

Interviewer: Ah, OK. So you don`t know where she lives, but you would like to meet her anyways?

B9g7 [nodded].

Interviewer: And if you get to meet her, do you think that would be safe?

B9g7: No.

Kappa family

Flanders, Belgium

Family members

- Dad, 38, medium digital user [B10f]
- Mum, 38, low digital user [B10m]
- Girl, 6, 1st year of primary school, medium digital user [B10g6]
- Boy, 9, 3rd year of primary school, medium digital user [B10b9]

Narrative

In this family parents strictly limit their children's "screen time" because they believe that their excessive use can lead to potential health risks as well as to asocial behavior.

The Kappa family consists of mum, dad, their nine-year old son, and their six-year old daughter. They live in a large row house with a garden that links to the play grounds of the youth movement, which is a gathering ground for children living in the neighbourhood. The house is located in one of the suburbs of a university town in Flanders. Both mum and dad enjoyed higher education. B1f has a master in audio-visual arts and in informatics. He works as a computer scientist for a private company, but in his free time he still tries to focus on his artistic interests by reading comic books, making drawings, etc. During the week he only arrives home around 7.30 pm. Mum works part-time at a university college where she teaches students to become professional teachers. The children engage in a wide variety of activities. Both of them go to art school as well as to the youth movement. B10g6 has dance practice on Saturdays and B10b9 plays soccer. Attesting to the creative interests of the family are the various drawings and little artworks found throughout the house. The family possesses a television without cable subscription, a DVD/Blu-ray player, a desktop computer, a laptop, a tablet, a radio/CD player, iPods, a smartphone (dad), and a cellular phone (mum). The children own music players, a Wii and kids photo cameras.

The most important device for mum and dad is the radio, which is always on. Mum considers herself to be "*allergic to digital technologies that involve screens*". Her computer use is limited to work purposes, checking e-mails, or very deliberate search actions such as finding a present for Christmas. Now that the family possesses an iPad she "*notices [she] is checking e-mails more often because it is faster*", but in general she still considers her exposure to screen technologies in her leisure time as "*very minimal*". Dad, as a computer scientist, used to follow the latest trends including Twitter, blogging, etc., but not anymore. Before he met his wife, he was "*quite addicted to watching television*", which partially explains why they currently do not have a cable subscription. When the children are in bed and household chores are done, mum and dad read books, watch an episode of a series or listen to the radio. If dad is alone, he sometimes browses the Internet.

The children in the kappa family like to occupy themselves creatively, but especially B10b9 would like to spend more time on the tablet or the computer to play games. "Screen time" in this family is restricted and related to a reward system. If B10b9 does his homework in an

orderly fashion, he earns half an hour of screen time to be used only on Fridays or the weekend. B10b9's screen time is directed towards gaming. At the time of the interview, his favourite activity was playing Minecraft. B10b6's screen time is usually allocated to watching DVDs, videos on YouTube or playing games on the tablet. She prefers games with girly themes, such as dressing up princesses or feeding Furby.

FIG. 8 PICTURE TAKEN WHILE 6-YEAR OLD GIRL PLAYS A MAKE-UP GAME

When the siblings use the tablet together, B10b9 is usually in control of the game, but B10b6 is equally absorbed and cheers him up and actively gives him instructions or suggestions on what to do. The children have their own iPods to listen to music and photo cameras to play with. These types of activities are much more encouraged by their parents than interacting with screen technology. On Wednesday, B10g6 and B10b9 go to their grandparents where they are allowed to watch television. There is one activity that gathers the family around the laptop. Whenever the red devils play [Belgian national soccer team], they watch the game via a live stream and support the team enthusiastically. Family life is little affected by digital technologies, but the fact that digital devices could have an impact is an important reason to impose restrictions.

Both children understand the uses of different digital devices. They know for instance that the iPad functionalities go beyond playing games and include possibilities such as messaging, browsing, map reading, etc. B10g6 has only basic skills in operating digital devices. She can browse menus on the iPad, open the (simple) game she wants to play, and navigate the YouTube app by clicking on videos in the side menu. As a nine-year old with reading and writing skills, B10b9 skills in operating technological devices are more advanced. He can play more complex games on his own, operate the television and Wii console, make use of search engines, etc. Parents trust B10b9 with the password of the iPad, but B10g6 is considered to have insufficient skills to operate the iPad without problems. Parents say that their children are "*fast learners who often only need to watch an operation once, after which they get the hang of it*". The children's expertise does not only come from the nuclear family or by trial and error. At school, they are confronted with Internet applications and services (Skype, Google,) and B10b9 uses a digital platform for exercises. B10b9 explores games together with friends.

Parents have positive perceptions of radio, music players, and books, and have - in general - (very) negative perceptions of digital technologies that involve screens. Nevertheless, both parents acknowledge that digital skills are an important competence to obtain in today's

society and perceive educational value in some digital activities (e.g. searching for information on YouTube, Google). They, therefore, sometimes struggle to balance this view with their strict approach regarding screen time. For instance, B10b9's time devoted to school exercises on the school's digital platform is included in the screen time he earns during the week and is a point of discussion. B10m and B10f's negative perceptions of digital technologies outweigh perceived benefits. Interacting with technology is considered as asocial and harmful, especially for B10b9's development as he already struggles with making social contacts. Mum and dad are also concerned about the addictive nature of screen technologies and have experienced that B10b9 "*becomes agitated after screen time*". Finally, mum attributes the deterioration of her eyesight to exposure to computer screens and therefore finds it wise to restrict her children's screen time as well.

Findings

1. How do children under the age of 8 engage with digital technologies?

In line with previous research (Holloway, Green, & Livingstone, 2013) our results show that young children are not only surrounded by digital technologies, but are also actively appropriating them. For instance, as the figure below shows, children engage in a wide variety of digital and non-digital activities. They embrace digital technologies with enthusiasm and consider them an important, although not a predominant part of their everyday lives. Indeed, in most of the families interviewed young children performed a wide range of digital as well as non-digital activities including practicing sports, playing outside, and performing social activities with families and / or friends.

FIG. 9 6 YEAR OLD BOY'S PREFERRED ONLINE AND OFFLINE ACTIVITIES

In general, digital technologies and activities are perceived as entertainment. This is because younger children`s use of digital technologies centres mainly around playing games and watching videos, TV programmes or films. Indeed, YouTube was one of the preferred services employed by very young children together with playing games on iPads, smartphones or game consoles. Even though children perceive digital technologies as fun, some parents referred to the educational value of these technologies as well. Indeed, one of the children interviewed had learned the basics of additions and subtractions by using a math App on the iPad, while in another family parents valued the fact that certain TV programs available on YouTube were useful for children to keep up their second language.

Some children, especially older ones, are also able to recognize other uses of digital technologies, for instance as a working tool or as a means of communication. However, the former was only observed among children whose parents employed technologies for work or for communication purposes at home. These children could, for instance, recognize an e-mail

interface and explain very basically what this was. Sometimes they even referred to the fact that certain devices at home such as their mum`s or dad`s laptop could not be employed by them because they contained "*important information*" or because dad uses it for work. In terms of communication functionalities, in 5 out of the 10 families interviewed children mentioned that they knew Skype and that they had used it once or more to talk to relatives abroad. Some children were also aware of social media services such as Facebook. Nevertheless, none of the children were active users of social media and their knowledge of these platforms, if any, was very limited. Their incipient knowledge of the existence of these platforms came mainly from having observed their parents or other social media users (e.g. older siblings, aunts, uncles, etc.) using these services.

In terms of access to technologies, all families interviewed have at least one **television** set, although three families do not have a cable subscription. In the Delta and Theta families, the absence of such a subscription is partially attributed to financial reasons, but also to family values such as favouring outdoor activities and sports or having a conception that the TV or other digital technologies can lead to a sedentary lifestyle which could be detrimental for their children. Interestingly, even though the Theta family did not have a cable subscription, the children still had access to their favourite TV programmes through renting DVDs from the public library. They also watched TV when visiting their grandmother or other relatives so they were quite knowledgeable about current popular children`s TV programmes. In Kappa family, the only reason for not letting the children watch TV was the parents' educational strategy with regard to media. They restrict their children's use of digital technologies because they consider digital technologies as a waste of time in comparison to other non-digital activities such as playing with friends or tinkering as well as perceive health hazards related to excessive use.

Children mainly use the television for entertainment purposes. In Belgium, which is characterized by a strong public broadcast service that encourages local content, children embrace globalized cultural texts as well as local productions. Their favourite television channels include Nick Jr., Cartoon Network and the Belgian public broadcaster TV channel Ketnet which is especially dedicated to children. Younger children (up to five) like programs such as Dora the explorer or Diego on Nick Jr., while older children prefer programs aired on Ketnet, such as Rox, a superheroes series, or Broodje Kaas, a children`s cooking programme.

All families own at least one **laptop/computer**, but in one of the lowest income families the computer is 11 years old and cannot connect to the Internet because of an outdated operating system. Children engage in a number of digital activities on the laptop/computer, but children who have access to tablets and younger children use them less often, probably because they are more difficult to operate than tablets. Playing games and watching videos on YouTube are clearly the preferred activities performed by children on laptops/computers. Other digital activities include doing homework and searching for information (often images) on Google and in four of the ten families, communicating via Skype with relatives abroad was also a rather common activity.

Seven families own a **tablet**, but only in five families the tablet is regularly used by the children. Indeed, in two of these families children own their own tablet, while in the other three it is a family possession (such as the TV), and therefore, they feel free to use it whenever they want. Children love tablets and the ones Children's tablet use is mainly centred around entertainment purposes: playing games, watching YouTube videos and sometimes taking pictures and videos, especially among the oldest children (6 years old or

older). In some families such as the Alpha and Delta family the tablet is also used for educational games or as tool to teach children (e.g. math, English, etc.).

FIG. 10 YOUNG CHILDREN LOVE TABLETS

In eight of the ten families at least one parent owns a **smartphone**. Smartphones are considered as personal devices by parents and, as some parents mentioned, they are fragile and expensive. Consequently, children are occasionally allowed to use their parent's smartphone and if that happens it is normally under close parental supervision. In the Iota family, children can use parents' old smartphones –not equipped with SIM-card - to play games and go online via WiFi.

> *Interviewer: Can you use your mum`s [i-] phone whenever you want?*
> *B6g6: I can use it sometimes*
> *(…)*
> *Interviewer: And can you use your dad`s [i-] phone?*
> *B6g6: Yes. I can play sometimes, but usually I cannot.*
> *Interviewer: Why not?*
> *B6g6: Because once I was playing with and I let it fall. I was very little, as little as [my 2-year old brother] is now. So, I didn't know it was made of glass.*

In half of the families interviewed a (portable) **gaming console** was present. While the PlayStation3 and xbox360 are perceived as adult devices and are only used by three children (together with dad in the case of B1b6, alone or together with siblings in the case of B9g5 and B9b7), the PlayStation2 and the Wii are perceived as devices targeted at children. Boys seem to be more invested in gaming on consoles for TV, while a portable device such as the Nintendo DS is considered fun by both boys and girls. With the exception of a few cases, such as Angry Birds or Super Mario, game preferences tend to be highly gendered. For instance, girls would typically play games that feature princesses, make-up or Barbies while boys would rather choose racing or fighting games. A few families possess 'kids computers'. These are mainly used by children under the age of 5 and seem to have lost importance due to the increased popularity of tablets. Indeed, as illustrated below, almost all the children interviewed aged 6 or above explicitly mentioned that they did not like these toys because they were for *"little children"*.

FIG. 11 DEVICES AND TOYS A 6-YEAR OLD BOY DOES NOT LIKE

As regards digital activities, young children`s favourite ones are watching television programs, watching YouTube videos, and playing digital games. While the consumption of games and Apps is centred around global, popular (online) content (e.g. Angry Birds or Minecraft) available in many different countries, the consumption of television programs and preferences on YouTube are centred around a combination of local (e.g. Ketnet TV series in the case of Flanders) and global franchises (e.g. Dora the explorer). Digital activities are performed across different devices (e.g. tablets, iPads, smartphones). Both older (e.g. television) and newer devices (e.g. tablet, smartphone) are liked by children. However, devices with touch screens have a stronger appeal for younger children than devices which must be controlled through a mouse or game-controller. One possible explanation is the intuitiveness of touch screen interfaces which responds to the direct stimuli of the user as opposed to mouse or controller-based devices which require more advanced cognitive and fine motor skills, as well as significant hand-eye coordination. For instance, in one of the families, the youngest brother (4-year old) placed all technological devices among the things he liked except the PlayStation controller. When asked why he didn`t like it he replied that it was difficult for him to play with it.

FIG. 12 ACTIVITIES, TOYS AND DEVICES A 4-YEAR OLD BOY DOES NOT LIKE

Interviewer: Why don`t you like this [pointing at the picture of the PlayStation controller]
B7b4: because I sometimes…because I sometimes don`t like it
Interviewer: Why?
B7b4: Because sometimes I cannot play
Interviewer: And why is that? Why can`t you play sometimes?
B7b4: Because, because it is… [He doesn`t seem to find the right words]
Interviewer: Is it maybe because it`s difficult?
B7b4: Yes and then I fall and they kill me.

1.1 Factors affecting digital use and perceptions

There are several factors affecting the ways young children perceive, make sense and interact with digital technologies. These include primarily the influence of their nuclear family (parents and siblings), but also their extended family, friends and peers, as well as the school they attend, the neighbourhood where they live and the literacy level and income of their family. In terms of family styles, we observed, for instance, that children of parents who value outdoor or physical activities (e.g. Gamma family – Delta family – Theta family) tend to spend less time using digital technologies and more time playing outside or socializing with other children in children`s clubs, etc. On the contrary, children of parents who must work while their children are around (e.g. Alpha and Zeta families) tend to use digital technologies more often and, consequently, are more knowledgeable and skilful than other children of their age. Some families simply do not see a great added value of digital technologies. These tend to limit their children`s encounters with technologies by restricting

the amount of technological devices at home, by limiting the time their children can watch TV or use other digital devices, but also by providing alternatives such as board games, books or outdoor activities children can engage with. The reasons for using or not using digital technologies vary a lot form family to family and even between parents.

Even though the nuclear family has a clear impact on children's use of digital technologies, it is not the only factor affecting children`s digital literacy. This is clearly illustrated by B8g6, a 6-year old girl living in one of the most digital deprived families interviewed, but who, nonetheless, is one of most digitally knowledgeable children we observed. Unfortunately, we were not able to observe her while using any digital devices (except the photo camera from the interviewer which she really enjoyed and commanded without any difficulties). Therefore, we can only make claims about her awareness and knowledge of digital technologies rather than of her skills.

The analysis of our interviews revealed at least four important contexts beyond the nuclear family that affect somehow children's uses and perceptions of digital technologies, namely the neighbourhood, the extended family, peers and the school children attend. Also more structural constraints, such as low family income or the low presence of digital devices at home, may also restrict children's access to digital media, as was the case in the Delta family and Theta family.

1.1.1 Neighbourhood

Families who live in houses with gardens and/or in child-friendly residential areas (i.e. no busy streets, neighbours with children, squares, playgrounds, etc.) talk more about playing outside and with their neighbours` children. A playground in the vicinity also encourages outdoor play. In the case of the Gamma family, because neighbours knew each other quite well and the neighbourhood was very safe, children could walk in and out of their houses quite freely to visit their friends in the neighbourhood. By doing this, the Gamma boys were able to play videogames and use game consoles which they did not possess at home.

1.1.2 Extended family

Although children's access to some digital technologies (e.g. iPad or tablet) is non-existent or restricted in some families, many children still get (less restricted) access to them somewhere else, for instance, at their grandparents` homes. In Belgium, because schools are closed on Wednesday afternoon, it is very common for children of full-time working parents to spend the afternoon at their grandparents. During the interviews, many children indicated that they enjoyed visiting their grandparents, among other reasons, because they could watch lots of TV or play with their grandparents` tablet or computers. This was especially noticeable in the case of families who did not own a tablet or a cable TV subscription (e.g. Delta family, Theta family). In one extreme case, access to digital technologies at the grandparents` is a necessity for school-related tasks (Theta family). In the case of the Beta family, even though the two oldest children possessed their own tablet, the mother`s digital literacy level was rather low, so it was the uncle who introduced the children to the latest digital devices, Apps and games, for instance by letting them play with his smartphone, which their mother did not possess. Finally, for children who have relatives abroad Skype offers a way to keep in touch and to *"talk about your feelings"* (B4g7). Grandparents mainly socialize children with television, and in one case also with the iPad. Peers and (young) uncles introduce children to

touch screen technologies such as the tablet or smartphone. As mentioned before, virtual worlds are often explored together with peers or siblings.

In families with more than one child, older siblings sometimes take over the role of parents in familiarising younger children with digital technologies and activities, especially because younger children are curious about their older siblings' media use and because media are used for shared activities. This was especially noticeable in the Beta family in which siblings gather around the tablet to search for music videos to sing-along or dance. In other families such as the Iota and Kappa family, children around the age of six are interested in and learn from the gaming practices of their older siblings. While B10g6 mainly watched and commented on B10b9's play, B8g7 & B8g5 also play the fighting games their adolescent brothers play.

1.1.3 Peers

Technology use is sometimes instigated at a friends' house. Children refer to watching a movie or playing games together. These shared activities are usually centred on the television, tablet, or gaming consoles. Especially with regard to gaming children explore together the possibilities of the controller and virtual world. Peers' possession of technology also makes children aspire the technology themselves, as shown by B5b6 whose favourite digital device is the Nintendo DS whom he does not have yet, but whose friend`s B1b6` posses.

Interviewer: Of all these things [showing him the pictures of devices he identified as the ones he liked most] which one do you like most?
B5b6: Nintendo.
Interviewer: Aha, Nintendo.
B5b6: Actually, B1b6 [his friend] has one like this [pointing to the picture of a PSP but actually meaning the Nintendo DS]
Interviewer; Ah, That`s true! He has one. And have you played with him?
B5b6: Yes!
Interviewer: And because B1b6 has one, you know the Nintendo. Or did you learn about it from someone else?
B5b6: Mmhh from B1b6.

Later during the interview, B5b6 spontaneously made a drawing of the Nintendo DS and, as he gained more confidence, he asked the interviewer if he could keep the card displaying the Nintendo DS. He promised that he would return the card to us as soon as he gets a real Nintendo, normally on his next birthday, as promised by his parents.

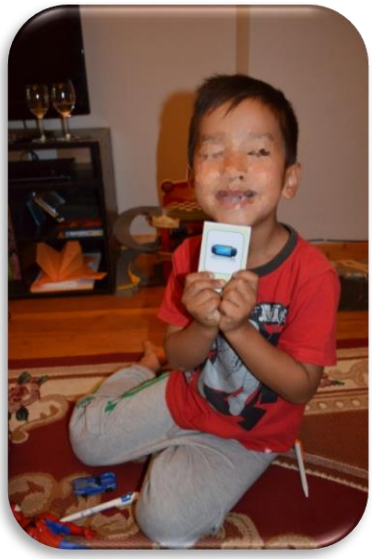

FIG. 13 B5B6 ASKING US IF HE CAN KEEP THE CARD UNTIL HIS BIRTHDAY

1.1.4 School

Compulsory education is mandatory for children aged six and older in Belgium, but most children start school at the age of 3. Schools run from Monday to Friday, usually between 8.45AM and 3.45PM. On Wednesday school finishes at 12. Consequently, children spend more than 30 hours a week at school, thereby making it a very important factor in shaping children's knowledge, and sometimes use, of digital technologies. Schools enjoy considerable freedom when implementing digital technologies in their study programs and curriculum. Therefore, digital literacy policies differ greatly from one school to another. In spite of this, one common technological device in almost all classrooms in primary schools is the interactive smart board which allows the teacher to display presentations, browse the Internet, show YouTube clips, watch (educational) TV programmes, etc.

Teachers play an important role as they are the ones who ultimately incorporate (or not) digital activities into their classes. Most of the families interviewed mentioned that their children watched movie clips or specific TV programmes in class. The smart board, for instance, is usually used in class to show Karrewiet, a television news program presented by children for children. In addition, the school plays an important role in stimulating families to adopt digital technologies. Many schools in Belgium use textbooks from publishers who also offer an online platform (e.g. Bingel) on which children can do exercises or play mini-games related to the content seen in class. In some schools, these exercises are even printed in the school diaries (also made available by the same publisher). What is more, children's activities on these digital platforms are forwarded to the teacher who can, in turn, recommend a pupil to do some additional exercises whenever he or she feels the pupil has an insufficient understanding of the course material. All parents are positive towards these initiatives although the extent to which the platform was actually used by children differed.

> *The nice thing about it [Bingel] is that it works with the same things [curriculum] there [at school]. There is a whole feedback system and, let's say if they make the same mistake again and again, they are suggested more exercises with that type of problem. (...) She has only gone on it [Bingel] one time though. (B4m)*

It is, however, important, to also consider the consequences of pushing all pupils to do homework online or to use these platforms outside school, especially among digital and economic deprived families who may not be able to afford up-to-date technologies at home. A single mum from one family that has no access to an up-to-date computer or Internet connection at home (because of economic reasons) fears that encouraging or enforcing children to do homework on the computer will increase the digital divide. At the school her daughters attend they are seriously thinking about strongly encouraging pupils to do all homework on the computer.

B8m: There has been a [teachers'] seminar, and I suppose we'll get the results on how it will work soon. On what they are going to do, what they are going to offer to children who don't own a computer at home.
Interviewer: Aah.
B8m: I think the platform is called 'Ik weet het'.
Interview: In other families, they talked about a Bingel platform.
B8m: Yes Bingel, that was already possible last year. You can do different exercises on it. But now it would be like – well they haven't taken the decision yet – that their actual homework would be on the platform.
Interviewer: So children would only able to do homework on the computer?
B8m: Well, not exactly...
Interviewer: Or pupils can print it and then make it on paper?
B8m: They do know that there are children who do not have access to a computer at home. But from the moment [B8g6] knew [of the possibility to do homework on the computer] she said she would not make homework on paper anymore. (...) So, then I will have to drive to granny every day so she can do her homework.

Finally, at least in one of the schools attended by the children interviewed, they already include computer class in the first year of primary school curriculum, i.e. 6-year old children. In these classes, children are familiarised with the computer and after successfully completing certain tasks, children have time to use the computer for entertainment purposes.

Every Thursday we go on the computer. And then the teacher says on what thing [to press]. And if you get three crosses, then you're free to play. (B8b6)

1.2 Children's digital knowledge vs. actual skills

In order to examine children's understanding and skills we used a three-step approach. First, children sorted out cards with technological devices, toys and free-time activities such as swimming and grouped them in three piles ranging from what they liked most to what they did not like. Only children 6 or older were able to group all the cards into three groups. Younger children usually only managed to select the cards they liked most or, at most, to group the cards into two big groups of the things they liked and the things they disliked.

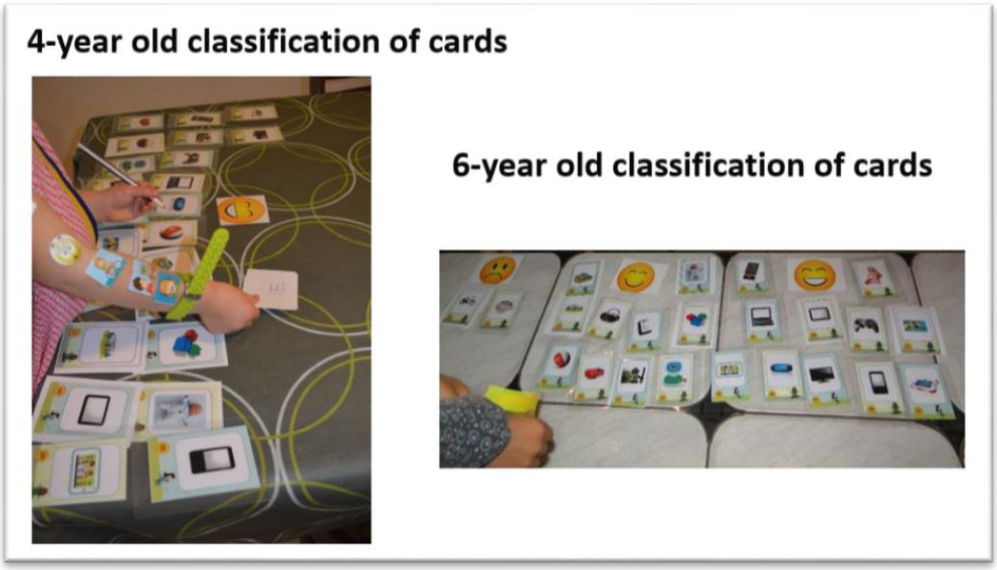

FIG. 14 A 4-YEAR OLD CHILD VS. A 6-YEAR OLD CHILD GROUPING CARDS

Whenever possible, children showed and used technological devices in front of the interviewer. Third, we used screenshots structured around five categories (TV remote controls; Android and iOS interfaces; websites targeted at children; Internet applications; and digital games) to probe children's understanding and skills of digital activities.

FIG. 15 EXAMPLES OF SCREENSHOTS

The interview data shows that use, knowledge and skills do not always happen simultaneously. Some children, for instance, have a notion of what an e-mail client or social media are, but have not yet acquired the skills to be able to use them. Likewise, some children have little access to technological devices, but are nevertheless very knowledgeable and up-to-date as regards digital technologies, at least as compared to their peers interviewed.

Almost all children, aged 4 or older, were able to recognise and name the pictures we showed them with common technological devices (e.g. the television, the remote control, the laptop/computer, the tablet, the radio/CD player and the smartphone) even if they do not have access to these devices at home. Not all children were able to identify the kids' computer, MP3 player or the PlayStation Portable (PSP). These devices have probably lost some of their popularity due to the rise of tablets and smartphones and the popularity of the Nintendo DS, a portable gaming console. Interestingly, even though many children, especially the youngest ones, were not able to recognise the PlayStation Portable (PSP) in the picture, most of them still picked up this card and placed it among the pile of things and activities they liked. When asked about why they liked that device they usually replied because it has a screen and it looks as something you can play with.

When we showed children screenshots of websites, applications, web browsers, etc., the majority of older children were are able to point out that iOS and Android interface can be found on tablets or smartphones. Most children, however, were familiar with a limited number of icons/pictograms on tablets such as YouTube, Google and sometimes Skype. Almost all children were able to recognise screenshots of games such as Angry Birds while Minecraft was mentioned by a few children and was played by at least two boys. As regards children's websites, we showed children screenshots of popular websites (e.g. Cartoon Network, Nickelodeon, etc.). We asked them if the picture we were showing them was a picture of the TV or of the computer. All children younger than five replied that it was a picture of a TV, while older children were able to recognise it was a screenshot from a website. Independently of this, practically all children could identify the most popular cartoon figures depicted in our screenshots, which may indicate that children usually watch these programmes on TV, but they do not necessarily visit the channel or the TV programme`s website. This can also mean that older children have a wider online experience which allows them to easily distinguish between a TV and a computer interface. One notable exception was the Flemish website Ketnet, which most children, independently of their age, were able to recognise as a website. This may indicate that children may be active users from this website, probably because they use it at home and also because several families mentioned that children watch the Ketnet news website Karrewiet at school (through the Ketnet website).

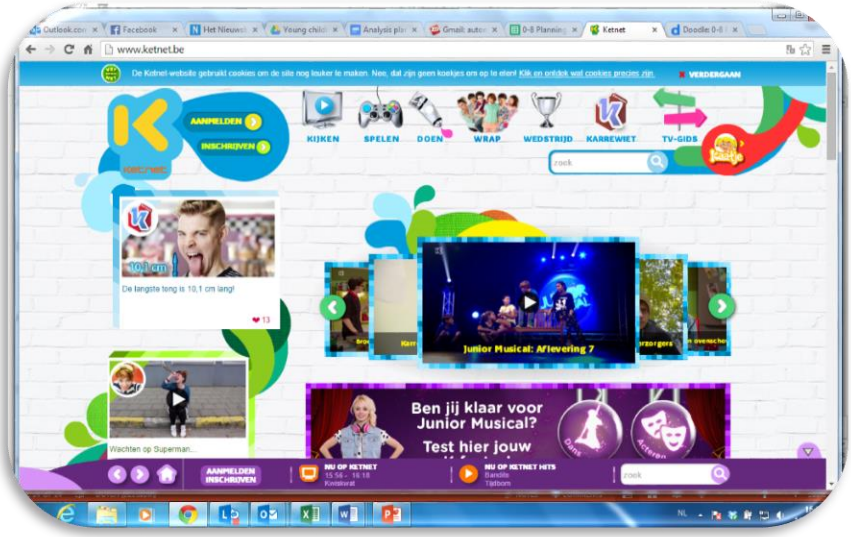

FIG. 16 SCREENSHOT FROM THE KETNET WEBSITE

Internet applications such as e-mail clients or Facebook are not recognized by most children under the age of seven. Occasionally, children made (correct) attempts to explain the function of Internet applications or web pages. Google and Skype, which is used by children with relatives living abroad, are recognized most. Some children have basic notions of e-mail but children in the sample do not use e-mail on their own.

Children`s knowledge of digital technologies (i.e. being able to recognise and name digital devices, services, applications, etc. and explain what they are) is much broader than their actual skills (i.e. their ability to actually use these digital devices, services, applications, etc.). Not surprisingly, young children's digital skills vary greatly. What remains constant, however, is the fact that, in general, young children`s digital skills are low (as compared to older children or adults) and the highest skills are observed among the oldest ones. In general, children have some grasp of device and game navigation. Navigation is notably eased when young children do not have to use the mouse or other game controllers. This was particularly noticeable in the case of the youngest children (4 or 5 years-old) who had difficulties (or were unable) to play games on game consoles such as the PlayStation or the Wii. They also found it very difficult to use laptops or computers. Very few children go online to find information other than YouTube films or a favourite TV programme. The ones who do are usually 6 or older and they can read and write, although not fluently. Because of their very limited search skills many young children turn to their parents to find the information they want.

As regards television, all children age six and older who are allowed to operate the television and remote control have basic operational skills such as turning on the TV and choosing a channel. Parents believe that their children have acquired these skills in a natural way. *"You show what button to press, you say it once and then they know…" (B9m).* A 6-year old girl`s mother also explains that:

> *B6m: If she wants something, she'll figure it out.*
> *B6f: Yes, she knows more about it than I do. Because I always use 'Back' [button]. And you have to press this button at least four times before you exit a movie. But she knows another button which directs her immediately back to the television screen. So, she only needs to press two [buttons].*
> *B6m: And then we are like [surprised], ohh, that's also possible!*

High digital children are aware of and can sometimes execute a complex series of actions including ordering (free) films, recording and replaying television series or navigating the on-demand video service. The results regarding operating the DVD player are mixed, depending on how integrated the DVD player is in the media diet of the family.
While portable gaming consoles such as the Nintendo DS or digital toys (e.g. V-Tech devices) can be turned on and operated by most children who have access to one, gaming consoles for television often requires parental support, usually from dad or another male adult such as the uncle in a single mother family.

> *B7b7: Can I show the Wii?*
> *B7m: Yes, but you can't turn it on and neither can I.*
> *Interviewer: You can't?*
> *B7m: Dad can.*

Young children in general, but especially those younger than 5, find it more difficult to operate the laptop or computer (without touch screen) than a touch screen device. Nonetheless even very young children can play simple games on the computer or laptop, such as Sarah's Cooking Class, if a parent or older sibling assists in starting the game. This inability to successfully operate the laptop or computer can be attributed to their yet not fully developed fine motor skills and lack of reading abilities, as the mother of a 6-year old girl explains:

> *She is not as good with that [the computer] because… She is good with touch screens. And with the TV, she can operate that one as well. But in the shop, we need to use the mouse to start YouTube. Once we've done that, she can click, but turning it on is difficult. She doesn't know how to click that. (B6m)*

Likewise, touch screen devices' operating systems are much more centred around visual cues (e.g. icons) than most operating systems found on the computer. The latter therefore require more detailed notions of the alphabet and readings skills.

Almost all children older than 4 have basic operational skills to operate touch screen devices, in particular the tablet, even if they don't have regular access to these devices. Children are able to confidently scroll through different menus, start and play games, and start and watch videos on the YouTube App. Some children, especially the oldest ones or younger ones with (the help of their) older siblings can even take picture or make videos. More complex actions, such as unlocking the device (if children know the password), accessing the App Store or Play Store, downloading games, and making use of photo-editing possibilities were only observed among children aged six or older who had high digital skills. We noticed similar skills when children used or talked about smartphones. However, children appeared to be a bit less confident in using smartphones, probably because they were less frequently employed by them because parents consider these devices as personal, but also too expensive and fragile to be used as toys.

Children under the age of six in general are not very skilled when it comes to the World Wide Web, unless the required actions are narrowed down to clicking. Young children`s online searching skills are very basic. This is probably because of their limited reading and writing skills which seriously reduces their searching capabilities to short and simple terms. Nevertheless, as observed during the interview, they sometimes succeed in finding more complex information with the help of the autocomplete feature of some search engines. This process, however, is less straightforward as it requires them to check and visit a few websites, usually the first ones suggested by the engine, before finding the desired website.

> *Interviewer: Google, yes. And what do you do on Google? What do you type?*
> *B5b6: Yes, R O X.*
> *Interviewer: Ah, Rox.*
> *B5b6: And then, here is the Rox song.*
> *Interviewer: And can you type something else or just Rox?*
> *B5b6: Just Rox.*
> *Interviewer: Just Rox, you don't look for anything else?*
> *B5b6: Yes, B E N, Ben10.*
> *Interviewer: Ben10? What is Ben10?*
> *B5b6: A cartoon.*

The next step in navigating the Internet, observed with older children who start to (or can) read and write, is to actively search for information on the Internet related to their interests. For example, one of the 6-year old boys could type in 'spelletjes' [games] or 'soccer' [to play soccer games].
Searching for information online is a trial and error process that is not exempt from risks. On the contrary, because most of the devices children use to connect to the internet are family devices, which are also employed by older siblings or parents, the possibility that children encounter commercial or other types of online content not meant for very young children or directly targeting an adult audience are high. Some children, however, are made aware of existing commercial risks by their parents who try to teach them basic strategies to avoid or minimize these types of risks, such as closing pop-up commercials and choosing free Apps/games to avoid additional costs. As a 6-year old boy explains:

> *B5b6: If it says 'free' you can click and otherwise you can't click.*

Also the mother of a 6-year old girl adds:

> *They can press all kind of stuff. Not that we have secret things on it [the tablet], but well, they just press everywhere. And with those games as well, you can buy things in these games. And that costs money. They don't know what they are pressing, so, if you are not there with them... Therefore, they can go on it [the tablet] but only when we are there with them. (B7m).*

2 How are new (online) technologies perceived by the different family members?

2.1 Parents

Digital technologies are an important part of many parents' life and are used for work, leisure activities, searching for information, and communication purposes. Central to many adults` occupation is the use of the computer and (Internet) applications for purposes as diverse as writing, communication (e-mail, reports), calculations, graphical design, scheduling appointments, networking, IT services, etc. A number of parents consider the computer and (Internet) applications as indispensable tools that help them to accomplish professional goals.

> *I don't think I could envision my work without a computer, even though it is teaching. But I do a lot of preparations on the computer, make tests, pages [students] work on. (B4m)*

> *At my work, I see technology as something that should help me. In particular for tasks such as text editing and basic website stuff that is just like writing. It is an advanced form, a 'technologized' form of writing. (B4f)*

A second important use relates to leisure activities, but large differences exist among parents depending on their perceptions of new media and digital technologies. While for some parents digital activities, such as browsing the Internet or watching television, constitute a

large part of evening and/or weekend activities (e.g. Zeta, Iota family), other parents, who often possess less digital technologies, value non-digital activities, such as reading or listening to the radio (e.g. Theta, Kappa family). In some cases, parents move away from using digital technologies at home because they already use the computer a lot at work. In spite of the different nature and frequency of use, all families use some type of digital technology. Low digital parents still use digital technologies to catch up with the news (B8m) or to watch TV series.

> *I read a lot. And, yes, you know, if there is something interesting such as Koppen [Flemish news program], for instance, then I might watch it. (B8m)*

A number of parents use social networking sites and telecommunications application software (e.g. Skype) to keep in touch with friends and family members. Interestingly, high digital parents often mention the value or gratifications found in using social networking sites such as Facebook, while low digital parents mainly refer to them as a necessity, for instance in order to be informed about the children in class or on camp.

> *I have Facebook because [my 6-year old daughter] went a year ago, or maybe two, on a summer camp with her rope skipping club. And the only way to get some information from them was via Facebook. And I've always been against Facebook.* (B8m)

Communication services such as Skype are very important for families with relatives abroad. Skype has a positive connotation, independent of the digital capital of the family. Communicating with loved ones abroad is one of the few online activities children perform together with their parents as illustrated below by a 6-year old indicating that "*we skype to our grandmother*"

> *B4g6: I know what this is. You can click on this. This is Skype.*
> *Interviewer: Ah you know Skype. What happens when you click on Skype?*
> *B4g6: On Skype you can Skype somebody that is not by you and then you can see them. And then you can say how you feel.*
> *B4b4: On the computer*
> *B4g6: And they can tell how they feel. They can see us (…) I know Skype. Skype is something with which you can see people on the computer. On Skype you can see people.*
> *Interviewer: And do you use Skype?*
> *B4g6: We skype to our grandmother because our grandmother lives in America*

While children grow up with currently available digital devices, parents sometimes struggle to keep up with them. This is evident in a number of families in which the parent(s), usually the mother, stated that her children know more about the technology than they do.

> *They can do a lot more [on a tablet] than I can. They can even take panoramic pictures while I don't have a clue on how to do that. (…)*
> *They figure that out all by themselves. They are also more adventurous (dare more). They are young and not afraid to break anything, while I am afraid to install something. You usually have to confirm or download something and then I am a bit weary. With them, it's like OK, OK and click, click (B2m)*

There are also considerable gender differences in parents' use of digital technologies. High digital parents for instance usually value both watching television and playing (mini-)games on the tablet or smartphone, but it is usually fathers who are involved in console gaming and follow the latest technological trends. Likewise, all fathers in the sample have smartphones in comparison to only six mothers. The single mothers in the sample do not own a smartphone. In the case of families with lower economic capital this can partially be attributed to financial considerations, but in general also to a lower interest in digital technologies. These (gender) differences in use are also reflected in the perceptions mothers and fathers have of digital technologies. Fathers are in general more enthusiastic and positive about digital devices and more strongly encourage the adoption of new media.
Parents have ambivalent perceptions of digital technologies and acknowledge both positive and negative aspects related to their child(ren)'s use of new media. Whether or not the positive or negative aspects are emphasized seems to be dependent on a number of factors including the amount of time that is spent on devices, the content, and parents' perceptions towards digital technologies in general.

Very similar to children's discourse on digital technologies, parents value digital technologies for their entertainment character. Most parents consider media as a valid tool for children to occupy themselves (or to kill time), as long as it does not interfere with other activities that are valued by parents. Media use is regulated in terms of frequency of use, the amount of time children can spend in front of screens ("*screen time")* and it is often allocated to specific moments, usually before bed time or dinner. Parents want to make sure that children's media use is part a healthy diet of activities. Only the Iota family seldom restricted their children's use of digital technologies in time. In the Beta family, children have little time to engage with media during the week, but can engage with media several hours in a row on Sunday.

The most prominent reason for parents to stimulate children's digital activities is the educational value of digital technologies (e.g. educational games or as a tool to help children with homework). A number of parents refer to playing games as beneficial for hand-eye coordination and improved spatial skills or as a fun way to acquire knowledge or skills (e.g. learning math).

> *Watching a movie, for instance, or learning a movie by heart that they have seen five times already. That's brainless, just staring at a screen. And gaming, that's for hand-eye coordination. (B7f)*

> *B1f: For me, technology is something really positive. For example, at school. For me, I think he learned math with Apps. And it is not easy, it is complicated for a four year old. Now he is six. But as a four year old he learned math with the Apps and now it is easier for him at school.*
> *Interviewer: Do you think it would have been more difficult to sit next to him and teach him with a book?*
> *B1f: Absolutely, because it is more interactive. You have the answer immediately. The feedback is instant.*

In contrast to the Eta family, parents in the Delta family and Kappa family do make a distinction between the value of educational games and commercial off-the-shelf games. Some parents also encourage their children to acquire a more profound knowledge or skills by using YouTube as a gateway to a wide range of tutorials, in particular related to current

interests or hypes such as Loom bands or Minecraft.

B10m: Oh, and with those loom bands, they watch that on YouTube to make complex things.
B10f: Yes, it is really true that they learn from watching these clips. It was the first time that I encountered it, and well, I was very impressed. So therefore we helped to find these videos.

Television was considered less educational by most parents, although some assigned educational value to a couple of programs.

B7m: You have to admit that things on TV these days aren't the same as the things we watched. If you look at Dora, for instance,… What else is on TV, Bubble Guppies
B7f: Diego, Umizoomi.
B7m: That [These programs] is to think along. What shape is this? What colour is that? What can you make out of these [shapes]? Dora even says it in English. Yes, these kids use English words sooner than us. I mean, those things. In the end, I don't think that's so bad.

Many children, however, mentioned that they watched TV at school. Later, when talking to parents, we found that in many schools children usually watch a children-dedicated news TV programme (Karrewiet) at school.

B2b8: I sometimes watch Karrewiet.
Interviewer: Where? On television or on the computer?
B2b8: At school after lunch.

In one low digital family without a cable subscription, parents are especially content that their children can see Karrewiet at school, because this allows the children to better understand and contextualize news they hear on the radio.

B10m: Sometimes we are also a bit surprised/frightened of the images we see [because the family relies mostly on the radio for news]. And then, well yeah, then those images for children...

B10f: Well, that is why I think it is good that they see Karrewiet at school. If they listen to the radio here, well with the news on the Tsunami for instance on the radio, you say well yes, okay, a tsunami. But if I saw images of the phenomenon half a year later I thought like "Yes, actually that is a lot more powerful than the emotions radio can evoke".

Parents acknowledge that the World Wide Web provides their children (with basic reading and writing skills) with a wealth of information that can be used for school purposes.

B10m: Last year they worked a lot on themes. And with each theme, B10b9 came home and spontaneously said "I am going to give a presentation" while that wasn't part of his homework. But then, he just went on Google images. And then copy, paste, that is how he does it.

For one single mum, the fact that her daughters will have to make presentations for school could persuade her to buy a new computer in the future.

Interviewer: When do you think the family will need a computer with an Internet connection?

B8m: For the sake of simplicity from the moment they need to write book reports. Well, not only book reports, how do you call it, when they need to present something.

Interview: Give a presentation?

B8m: Yes, give a presentation! But it would be pure for the sake of simplicity, because in the end you can also go the library and get a book. So, mmhh, really necessary? I don't really know.

Although digital technologies are commonplace in most families interviewed, they are only occasionally shared as a family activity. In most instances, bonding occurs between siblings, for instance watching television together or taking turns when playing games while communicating with loved ones abroad (e.g. via Skype) is one of the few online activities that children perform together with their parents.

Despite the widespread use of digital technologies in Belgium, many parents perceive them as expensive, in particular smartphones and tablets. This theme was recurrent in many interviews irrespective of the socio-economic status of the families. Parents also indicated that because children are not very cautious they buy the cheapest versions of these devices to be used by their children. Other strategies include supervising children closely or forbidding their children to use certain devices (e.g. expensive smartphones). In addition, financial considerations were also mentioned when purchasing online content or even movies on-demand. For instance, parents do not allow children to download games that are not free of charge unless they ask for permission.

2.1.1 Parents` perceptions of risks

During the interview parents discussed the risks associated with digital technologies but they seldom believe that these risks apply to their young child(ren). Indeed, many parents argue that their children's use of digital technologies is limited to a number of activities that are considered as safe. These include playing games on the tablet, usually offline, but also watching videos on YouTube. Even though browsing and watching videos requires children to go online, and encountering a less controlled environment, most parents believe that their youngest children will not (be able to) encounter inappropriate content or other types of risks there. This is mainly because they assume that their children have insufficient digital skills to start exploring the digital world - and in particular the Internet - on their own. They also think that that their children have not yet reached an age at which they are attracted by and able to engage in risky (online) behaviour. As observed during the interviews, however, some children spend a considerable amount of time on online applications or services such as YouTube or Google which sometimes can lead to potential risky experiences.

B9g7: [my 15-year old brother] always looks at pictures of pretty girls

Interviewer: And you look at those pictures with him?

B9g5: Real naked women and so, that's what he looks at. To see if he can get a girlfriend

Interviewer: Ah, OK. And those are really naked women? What do you mean by that?

B9g7 They sometimes wear a bra and panties and sometimes they are completely naked.

In spite of this, the parents interviewed feel quite confident that their children will not get into trouble and, in general, they believe that they are successful in mediating their children's digital activities. In contrast, parents express fear for the future media habits of their children especially when they become teenagers. For instance, in the Iota family, the mother and the stepfather do not seem worried about their youngest children`s use of digital technologies (B9g5 and B9g7), however they do express considerable concerns about their older children and, in particular, their 15-year old boy, who, according to them, uses technologies excessively and has had some bad experiences online.

B9m: [my son] is addicted

Interviewer: The one who is 15-year olds?

B9f: He always has his laptop or his smartphone with him. He uses them all the time. So, yes, I call that addicted.

(…)

B9m: With the 15-year old boy we don`t have any control about what he does [online].

B9f: And we`ve already had a bad experience with him. With those 'special' sites.

When talking about the future, parents identify several potential risks including meeting strangers, revealing personal information, cyberbullying, exposure to inappropriate content, and effects on identity construction and image. In particular, parents feel that risky online experiences can be exacerbated by the use of social media or chat rooms, which their younger children have not yet started to use.

Interviewer: In general, do you consider technologies as something rather positive or negative?

B6m: Positive. I don`t think that we have gotten to the negative things, yet. I worry in advance, though, about the things that could happen in the future especially when I listen to my friends who have older children talking about Snapchat and that sort of things. We don`t know [Snapchat], we haven`t even seen it. But I do worry a bit about the future. [My friends` children] are in their puberty. They are all the time making photo shoots of themselves. So that worries me about Facebook. So I really try that [my daughter] does not get into that.

Interviewer: So she is not on Facebook, yet?

B6m: No, she doesn`t know about it yet (…) I`ll try to keep it like this as long as possible. I`m a bit scared that the time will come when she will [start using it]. Also when I hear those newsmagazine programmes about cyberbullying. [Teenagers] are so concerned and busy with their own image. I already notice that [my daughter] is into her looks, and she`s so young! So, I worry about what the future will bring. So I really try to block [Facebook].

When referring to specific risks affecting young children some parents expressed some concern about inappropriate content such as exposure to violent or sexual content (e.g. on YouTube), but once again they explained that this is a type of risk that mainly applies to older children. In spite of this, most parents indicated that they (try to) keep an eye on their children while using technologies:

> *[My 6-year old child] is not watching those [music videos perceived as sexual] on her own. She is still very innocent. But she watches clips of Frozen and then you stumble upon those songs [explicit music videos]. And from those Nicki Minaj songs [parody of Nicki Minaj on a popular Flemish television series] it goes very quickly in the menu to... all kinds of stuff she doesn't need to watch. It goes really fast, you know. (B6m)*

Apart from keeping an eye on the content children watch online, parents also admitted that they are mainly concerned about "accidental" in-game or App purchases. With the exception of B5b6 who could freely browse the app or play store and install free games on his own tablet by himself, most parents who own a tablet have set a password and forbid their children to download games that are not free. With this strategy, parents manage the content their children are exposed to and keep control of the family budget. In the case of free games children most often found new games by clicking links in games that were already installed.

> *B6g6: I found the dog [app Talking Bend] and then there was something on top [of the screen] and then if you clicked there [on an icon that said 'free'] you got this game [app Talking Tom].*
> *Interviewer: So you first got the dog, then you clicked on the dog and that's how you got to Talking Tom [App]?*
> *B6g6: Yes.*

In spite of the fact that online virtual spaces are often commercial spaces and, consequently, children who go online are frequently confronted with advertisements, parents did not really seem aware nor worried about their children's exposure to commercial content. Even though parents of young children do not seem to worry much about commercial, contact and conduct types of risks (See Livingstone et al. 2011), most of them expressed concerns about the highly attractive nature of digital technologies and its potential excessive use. Partially related to the fear of addiction, is some parents' concern on the immediate, easy and instantly gratifying nature of digital technologies and games in particular. Parents are afraid that children cannot handle boredom anymore and that other valued activities have become less appealing. In particular, they fear that digital activities may displace other valuable activities such as social and physical ones or cause other types of problems such as sleeping disorders or asocial behaviour. When we interviewed children, however, they all seemed to enjoy both online as offline activities and toys equally. Parents also agreed that the use of digital technologies becomes problematic when it comes at the expense of or displaces activities that are considered more essential, such as playing outside or face-to-face interactions:

> *B3m: It's about what they miss out, eh. At the moment you are doing that [sitting in front of a screen] you can't do anything. You can't get bored, you can't play, you miss out social contacts. Those are things you can't do 'alone alone'.*

This was also the reason why B4m did not allow her children to play non-educational games. She believes that playing commercial, off- the-shelf games would decrease her children's interest in educational games. Parents also referred to mood changes after children used digital technologies, in particular gaming devices. Digital technologies are perceived to be hyper-stimulating and pump up the adrenaline of children, which makes them more difficult to handle. Several parents (e.g. B1m, B10f) stated that after certain games or television content their children were *"agitated"*. Only B7d stated that they use television to relax their children before going to bed while B10m fears a detrimental effect of exposure to screens on

eye sight. Because of all these reasons parents strongly believe that children's technology use should be embedded in a healthy mix of online and offline activities.

> *[My 6-year old son] can be absorbed with playing. If you offer him to do something else he thinks that it`s boring. I think that the problem is that the PlayStation, iPad offer too many stimulus. But I don`t think in an apocalyptic way. He also plays with other children and enjoys doing other things. (B6m)*

Finally, it is important to stress that even though most parents agree on certain general notions about children`s use of digital technologies, we were still able to observe that their views about the potential positive or harmful effects of technologies on children differ largely, even within the same family. This was clear in the different ways in which parents described digital technologies ranging from *"largely redundant"* to *"acceptable"* or *even "vital"*. For instance, while some parents (e.g. Kappa family) consider almost every use of digital technologies as anti-social, including playing multi-player or strategy games together with friends. Other parents (e.g. Alpha or Zeta family) see ways in which digital activities foster interaction between family members, for instance when a child needs help to progress in a game they can play together with dad or an older sibling. We also witnessed some degree of incongruence in terms of parent`s discourse and behaviour. For instance, B9m believes that technologies '*make people stupid (…) and lazy',* as well as *anti-social*. In spite of this, she thinks that it is important that children use technologies as much as possible '*because the world advances too fast'* and children need to be able *to catch up*. In other cases, some parents refer to the inevitability of technologies as explained by B1m who strongly stated that she does not *"associate technologies with something positive."* However, she adds:

> *B1m: "I think it`s important that [my son] has a fluent relationship with technology. Technology is part of our lives today. I don't think you can avoid technology. I don`t think it`s a good idea to prevent children from using technologies".*

2.2 Children

Young children love technologies and, in general, they relate them to positive things such as entertainment, fun or games. Digital technologies are, indeed, an integral, although not dominant part of children`s lives. Apart from digital technologies all children interviewed said that they liked performing other activities as well, for instance, riding their bike, going to the playground, practising sports, swimming, reading books, playing with their toys, etc. The picture below illustrates a 6-year old boy`s favourite digital and non-digital activities.

FIG. 17 6-YEAR OLD BOY`S FAVORITE DIGITAL AND NON-DIGITAL ACTIVITIES

All children interviewed used some or even several technological devices on a daily or weekly basis depending on the accessibility to such devices at home. The most popular one was the TV which practically all children watched every day. Children`s preferences of devices varied a bit from family to family, but in general, most children placed the TV, the tablet, the computer and some games consoles among the things they liked most. Interestingly, music devices such as the radio or MP3 players were usually not placed among the children`s favourite. However, they were not placed among the devices children disliked, either. In general music devices were placed somewhere in the middle. We were also able to observe some consistent differences in the preferences of older (6 or older) and younger children (5 or younger). For instance, younger children placed toy computers or tablets among the things they like most. On the contrary older children usually placed these devices among the things they disliked because, as most of them explained during the interview, these toys were for *"little children"*.

FIG. 18 DIFFERENCES IN DEVICES PREFERENCES BY AGE

Because of the positive character that children attach to digital devices most children aspired to getting access to or to own a device they did not yet possessed. For instance, older children who were allowed to play games on their parent's smartphones or tablets expressed that they would like to have their own smartphone or tablet. Other children told us that they wanted a new PlayStation, a tablet, a Smartphone or a Nintendo DS, usually because they had seen or used the device at a friend`s house or because an older sibling or parent had one.

The older the children are, the more they seem to reflect on what devices and functionalities they want to engage with. In general, children`s responses about the opportunities that digital technologies offer are captured in one word: Fun. Fun, however, is understood in various ways by different children, especially among children of different ages. As opposed to traditional toys where girls usually like dolls and boys cars, we were not able to observe significant gender differences in the digital preferences of children. This was neither observed in the non-digital activities they enjoy such as sports or going to the playground.

Age seems to be an important factor that does not only influence children`s preferences of digital devices, but more essentially, it affects the ways in which children make sense of the digital world. For instance, older children had some notions of the use of digital technologies for purposes other than fun, for instance, for sharing information (e.g. Facebook), for finding information (e.g. through Google) but also for more instrumental purposes such as learning or even for work (e.g. e-mail).

Interviewer: How did you learn mathematics?

B1b6: I haven`t learnt mathematics. I learn the numbers, to add and subtract numbers.

B1f: Where did you learn the numbers?

B1b6: On the IPad (with a tone as if it were something obvious). Because there are little boxes to add up and subtract. (Asking dad and mum) Can I shown them [on the iPad]? You can also do it on the portable phone [iPhone]

B1f: he loves to do the mathematics. I downloaded the application and he started to use the application one year ago?

Interviewer: Why does he like it?

B1m: For him it is a game. He associates the numbers with a game. He is competitive: I did it! I won! And he likes learning in general.

WD: Do you think he likes it more on the iPad?

B1f: Yes for sure! He is using it all the time.

Interviewer: What can you do with the iPad?

B1b6: (pointing at some icons on the home screen) I can play this game or other games

B1b6: (when pointing at a folder). This is important. This is boring, this is boring, this is boring.

B1f: This is not boring.

Interviewer: What is important? How do you know that this is important?

B1b6: Because I know. Well, no actually this is not important… Just because. I don't know. It is not important. Dad has to save it. If he does not save it (for work) then he has to start all over again.

B1f: You don't have to delete these things.

B1m: How do you know which things are for work and which are not?

B1b6: Just because!! I know.

Just a few older children had incipient knowledge, although no experience, of social networking sites such as Facebook. The youngest children interviewed were not really aware of social media. In the following quote a 7-year old girl explains what, according to her, Facebook is:

B9g7: [at home] we are not allowed to use Facebook. Only the oldest ones (…) I have four brothers and a very big one, he is 20, I think. He is all the time on Facebook. But we [B9g5 and B9g7] cannot go on Facebook.

Interviewer: And do you know what Facebook is?

B9g7: There you can find a girlfriend and look at pictures. And then you can choose which girl you find the prettiest…And you can fall in love and then the girl doesn`t know it. And then you can send her [a message]. And then the girl knows…And then they start sending messages to each other. (B9g7)

In terms of communication functionalities, half of the children interviewed knew Skype and enjoyed using it to talk to their relatives abroad. Both the older and younger children in these families knew what Skype was used for, however only the older children were able to express rather clearly what Skype is and how it works.

VD: What is Skype?

B10g6: It`s to call someone.

B10b9: Yes, so that you can see each other

B10g6: Yes

Interviewer: So you both know it?

B10g6: We often use it with Godmother

B10b9: MY Godmother

B10g6: Yes your [godmother], my aunt.

Interviewer: And why with her?

B10g6 and B10b9: because she lives in Singapore.

So, in general, we can conclude that children`s engagement with digital technologies relates to the following main motives: passing time in a fun and engaging manner, sharing an activity with siblings, friends and sometimes with other family members (e.g. playing games or using Skype), and learning about things they like or are interested in (informal learning).

2.2.1 Young children's perceptions of risks

Young children do not seem very aware of, or they may not have been confronted yet, with potential risks associated to the use of digital technologies. When explicitly asked if they had ever experienced or seen something "not (so) nice" on the computer or the tablet, or if they knew someone who had, almost all of them replied that they had not. However, a few children expressed some concerns or told us about less pleasant online experiences. For instance, a few children referred to scary, violent or sexual content. However, we must be careful when interpreting this because in one case what was considered as scary was the movie "The Lion King". In other cases, however, children expressed that they did not like games where people hurt or kill each other and two young girls mentioned that they had seen naked women on the tablet and that the women were *"ugly"* which may imply that the experience was not a very positive one. Commercial aspects of digital devices were also disliked by some children.

Children however seem to react proactively to scary content by avoiding subsequent exposure.

B3b4: [My 6-year old brother] finds this movie scary.
Interviewer: Ah, the Lion King.
B3b6: No, BOTH B3b4 and I find that movie too scary.

Interviewer: Do you think that your children have ever watched something on television that you considered... Hmm, I would rather have that they did not see this.
B3f: No, no.
B3m: They don't operate the television by themselves so we sort of have that under control. And [our 6-year old son] comes to us himself [whenever he sees something scary]. He doesn't want to see the Lion King anymore. He sets that boundary himself: "B3b4, you can watch it, but only when I am not here", he says. That is actually something they can do pretty well.

On the other hand, children are made aware of some risks, for instance commercial ones, by parents. Children who can access the Play Store or App Store are usually aware that they either have to ask a parent for permission to download a game or that they can only download games with the label 'Free'. Parents who allow their children to access tablets or smartphones also make sure their children understand that these devices are expensive and need to be treated with care. Interestingly, even though many of the children interviewed could not read or write or they were just starting to learn how to do it, the ones who used tablets were able to recognize the word "free" even when it was written in English which is not a language very young children in Belgium usually command.

Interviewer: Were the games here when the iPad was bought?
B1B6: This game for instance?
Interviewer: Yes, how did you get them?
B1B6: I buy them! (With a tone which implies isn`t it obvious?).
Interviewer: Where do you buy them?
B1B6: In a place
Interviewer: Do you buy them on your own?

B1B6: No, my dad does, with money.
Interviewer: Ah with money, how does it work?
B1B6: I choose them.
Interviewer: And then what happens?
B1b6: My dad buys them unless he says no.
Interviewer: Does he buy all the games you want?
B1B6: No, not all of them.
Interviewer: But if you want a game you just search for it and ask for it?
B1B6: Yes
Interviewer: What about mom?
B1B6: Mom does not decide. Mom always says 'ask dad'.
Interviewer: so when dad says no, you can't buy a game
B1B6: No [I cannot], because it costs too much money.

Interviewer 1: And can you download games on your own?
B5b6: yes. My dad lets me
Interviewer2: And can you download games here [on the Tablet]? And must you pay for them or can you just get them without paying?
B5b6: If it says 'free" then you can click, otherwise you cannot
Interviewer2: So you can click everywhere where it says 'free' just like that?
B5b6: Yes

Even though the searching skills of young children are quite limited, among other reasons because they are just starting to learn how to read and write, we observed during the interviews that some children succeed in finding games, information, videos or websites usually with the help of the autocomplete feature of some search engines. This process, however, is less straightforward as it requires them to check and visit a few websites, usually the first ones suggested by the engine, before finding the desired content. This trial and error process is not exempt from risks. On the contrary, because most of the devices children use to connect to the internet are family devices which are also employed by parents or older siblings, the possibility that children encounter commercial or other types of online content not meant for them or directly targeting an adult audience are high. This potential risk is illustrated by the pictures below which were taken while B5b6 was showing us how he typically used the internet on his dad`s laptop.

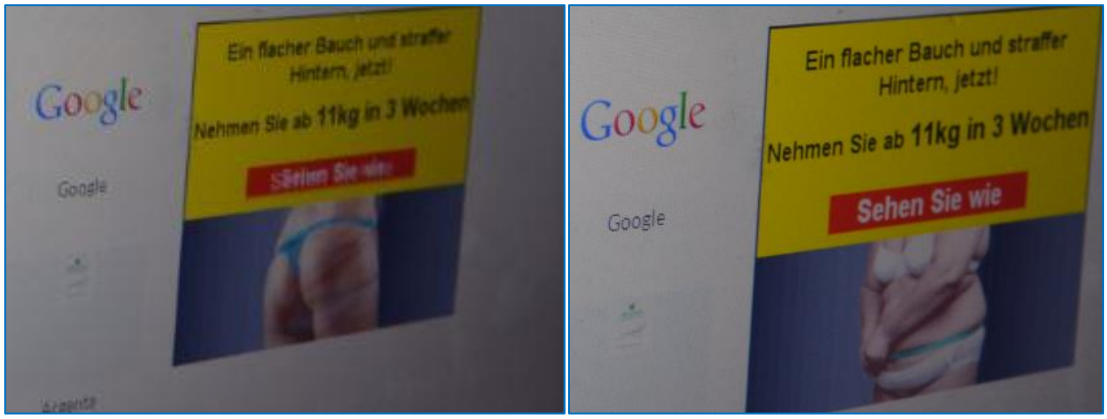

FIG. 19 PICTURES TAKEN WHILE 6-YEAR OLD CHILD BROWSES FOR INFORMATION ON HIS FATHER`S LAPTOP

Other children interviewed expressed that they do not enjoy content that is not interesting or relevant for them, for instance explicitly adult or commercial content on the internet:

Interviewer: Have you or has a friend or anybody you know ever seen something that is not so nice on the computer. Or is it always nice and fun on the computer?
B4g7: On the computer sometimes we look big people, and we don't like it
Interviewer: And why don't you like it when you see big people on the computer?
B4g7: Big people we don`t like because they…because big people they are not interesting for children because they only say things about things that you can buy in a store. Or sometimes they put silly films on computer, like this (pointing at a YouTube screenshot displaying some videos).

B9g7: [my 15-year old brother] always looks at pictures of pretty girls
Interviewer: And you look at those pictures with him?
B9g5: Real naked women and so, that's what he looks at. To see if he can get a girlfriend
Interviewer: Ah, ok. And those are really naked women? What do you mean by that?
B9g7 They sometimes wear a bra and panties and sometimes they are completely naked.
(…)
Interviewer: And are these ladies pretty?
B9g5 and B9g7: No, ugly!

3 What role do these new (online) technologies play in the children's and parents' lives?

3.1 How important are digital technologies for family life?

Digital technologies are an important aspect of most family members' life. As discussed in more length in previous sections young children mainly value digital technologies for their entertainment value and as an additional opportunity to have fun, while parents value a broader spectrum of possibilities related to work, entertainment and relational uses. Although these values are salient in most families, the specific ways in which technology is appropriated in families depends to a great extent on specific family characteristics and values. Families (e.g. Gamma and Delta family) that encourage outdoor activities were more likely to restrict technology use; Families (e.g. Alpha family) in which parents frequently work from home or parents who sometimes need to work in the evenings or in the weekends tend to perceive digital technologies as an efficient, although not always a desired time-filler which help them keep their children busy while they finish their work.

> *Sometimes [my son] gets bored when we have a deadline, he has to stay alone watching TV or playing with the iPad, but he cannot go outside on his own (….) So I associate the fact that he`s playing with the fact that I cannot pay attention to him…so for me [playing videogames] is not something that we do together. (B1m)*

In families with lower cultural capital (e.g. Iota and Epsilon families), parents are more lenient towards digital technologies and let their children explore these quite freely as compared to the other families interviewed.

Despite the importance of technological devices to individual family members, family activities are usually centred around offline or non-digital activities, such as going to the playground, swimming or riding bikes. Parents' main contribution in children's experiences with digital activities is to help to initiate digital activities, provide help whenever necessary and keep an eye on their children. They are seldom actively involved in the activities their children engage in, although some exceptions exist, such as a couple of fathers who played videogames with their children, or a family who sat together to watch a TV series on YouTube. Another family accompanied their children while playing educational games and the families who used Skype they usually did it as a family activity where they together called their loved ones living abroad.

> *"[Dad] chooses to play with him with the PlayStation or with the iPhone. They can play together. I cannot because I don`t like it, so we read a lot together, but if I have to choose between a book and the PlayStation, for me the book is better." (B1m)*

3.2 Do digital technologies facilitate or hinder family life?

Parents have ambivalent opinions and attitudes towards digital technologies. In some cases, digital technologies are sometimes seen as a tool for family bonding (e.g. Eta family) or as social in general because it takes place in a shared space (e.g. Zeta family). Most parents we interviewed, however, lamented that many digital devices, in particular the tablet or gaming consoles, foster individual play. Children therefore cannot use digital devices during certain family moments such as dinner and parents try to embed the time spent on digital technologies in a healthy diet of online and offline practices.

Even though many parents condemn the practice, a large majority admits using (new) media to entertain or to keep their children busy whenever they have little or no time to be with them. This practice is most common when cooking, working or doing household chores, although some parents also use this strategy when they have to leave home for 5 minutes, for

instance, to go to the bakery or simply when they are too tired. In a way, many parents believe that digital technologies facilitate their life, nevertheless many also feel a bit "guilty" of using technologies in this way and they somehow justify their behaviour by explaining that when this happens they have no other option at their disposal. Although using digital technologies as 'babysitters' may not encourage parents-children interactions, it may help busy parents cope with their busy agendas and, consequently, release some stress. So, if not excessively employed, and depending on the context when and where this strategy is used, it can potentially have some benefits as well.

3.3 The impact of digital technologies on parenthood

In general, we did not find evidence that digital technologies impact parenthood in a significant way. Conversely, it seems that parental styles, family dynamics and family values shape the ways in which technologies are appropriated at home. We saw, for instance, that families who value sports and outdoor activities try to limit their children's exposure to technologies by acquiring fewer digital devices, by setting up strict time limits to use them, but also by actively offering attractive, non-digital alternatives to their children, such as playing board games with them, encouraging them to perform hobbies, playing sports, etc. Parents who valued digital technologies because of their educational uses or simply because they loved them themselves, acquired more digital devices, also for their children, and encouraged their children to explore the possibilities of the digital world. These parents usually felt very proud that their young children possessed high digital skills for their age and usually encouraged their children to show us what they could do on the devices they possessed.

Last, we were also able to observe some family conflicts. In general these conflicts emerged because one of the parents viewed technologies as intrinsically positive, also for child development, while the other one saw technologies as essentially the opposite. This conflict of values and interests was particularly noticeable in the Alpha and the Iota families. In spite of having totally different cultural and even ethnic backgrounds (e.g. one mother was a post-doctoral researcher at a prestigious university and the other one had only finished primary school), in both families the mother had a negative view of technologies and the fathers a very positive one. In both cases, however, the mothers also shared the view that technologies were something unavoidable and they were aware that in today`s society there is no other option than to keep up with technological changes. In spite of the divergent father`s and mother`s views of digital technologies in these families, in both of them the children used technologies quite intensely and were among the families who placed less time restrictions to their children.

4 How do parents manage their younger children's use of (online) technologies?

4.1 Parental mediation

Parents seek in varying degrees to balance the psycho-social and educational advantages of digital technologies and the negative effects that may be associated with excessive use and certain types of content.

Parents interfere and guide the interactions children have with media and technological devices in diverse ways even within the same family. Independently of their ethnic and socio-economic background and their cultural capital, all parents interviewed employ some type of restrictive mediation strategies to control the time children spend on media and digital technologies. Fewer parents employ strategies to control the content their children are exposed to, although they usually admitted to "keep an eye" while their children are online (e.g. While playing online games or watching YouTube films). More active parental mediation strategies such as co-use in which parents share media use with children, and active or constructive mediation to educate children on media use and explain complex content (e.g. Koolstra & Lucassen, 2004; Nikken & Jansz, 2006) were less often used. This is probably because most parents feel that their children`s digital behaviour is quite safe and they associate the need for more active parental mediation strategies with older children (e.g. adolescents).

Parents are mainly worried about adolescents' relational use of digital technologies - referring to diverse risks including an excessive emphasis on looks and image and contact with strangers - and about adolescents' exposure to inappropriate content such as pornographic material. In contrast, parents consider their young children's use of digital devices as rather innocent, especially because it is believed to be limited to a specific set of activities, such as watching television channels for children or watching YouTube videos which they perceive as harmless. An additional reason why most parents in our sample believe strong mediation of media use is not necessary yet relates to the inability of their children to read and write. Without these abilities, parents believe children's skills for exploring and accessing inappropriate content are limited.

> *We are aware that at certain moment in time we might need to be [more attentive], from the moment she can type words (….) then I'll probably change my password or use a filter to block certain words. (B6m)*

Parents' main concern is young children's excessive exposure to digital technologies and, therefore, restrictive parental mediation strategies, especially as regards to time, were discussed the most during the interviews. Only in the few cases where children had been exposed to (perceived) risky or harmful content such as violence or sexual content, parents intervened and discussed the content with their children. For instance, B1m saw her six-year old son watch a cartoon in which, according to her, one of the characters was being tortured. Her son did not seem to perceive the cartoon in the same way, though, and he found it funny. So, instead of forbidding her son to watch the cartoon, she "tried to explain her point of view" and told him that she did not think that that cartoon was funny and explained to him why she thought that way. In another family, B6g6 sometimes passes by the section with adult-rated content while browsing the online video-on-demand services. This section is not accessible to B6g6 but she is nevertheless exposed to a suggestive image that accompanies the menu. Whenever this happens, B6g6 calls her mother and yells that there are *"big breasts on the television"*. The mother explained that when that happens she comes to her and they both end up laughing and making jokes about it.

Active mediation strategies at this developmental stage seem to be directed more towards explaining how a digital activity can or must be performed. A number of parents explain that

children sometimes ask for help while they are playing a digital game or when they have problems operating a device. Similarly, parents and children sometimes explore together homework or educational exercises for which the computer is necessary.

Given that children's media preferences not often coincide with those of parents, co-use was not very popular (except in the few cases where some dads played videogames with their children). Typical parents` expressions regarding their children`s TV programmes were "If you have seen one Dora [episode], you have seen them all". Basically, when parents have little confidence in their children using a certain device, co-use comes forward as a mediation strategy:

> *B7m: When I am playing Fruit Ninja, they sometimes ask: Can I play as well? And then I'll let them, but only that [activity].*
>
> *Interviewer: Why only that activity.*
>
> *B7m: They can press all kind of stuff. Not that we have secret things on it [the tablet], but well, they just press everywhere. And with those games as well, you can buy things in these games. And that costs money. They don't know what they are pressing, so, if you are not there with them... Therefore, they can go on it [the tablet] but only when we are there with them.*

As follows from the few concerns parents have with regard to inappropriate content, most families do not make use of parental controls. Parents do, however, set up passwords on technological devices such as Tablets or Smartphones to avoid accidental online purchases such as Apps. The few parents who referred to parental controls during the interview talked about word filters (B6m) or tracking services to check their older children`s online behaviour (B9f).

In two families no or little concerns were expressed regarding the digital content their young children were exposed to (e.g. online or videogames or websites). These two families were also the ones with the lowest cultural capital. In both these families the highest educational level attained by the parents was primary education. One of the mothers did not even finish primary education and she could, therefore, not read nor write. It is possible, therefore, that the level of awareness of these parents as regards digital safety issues is somehow limited by their insufficient cultural capital, therefore, more efforts should be made in order to reach and support these families so that parents from socially challenging environments can increase their level of awareness regarding potential digital risks, but also develop effective measures to better protect young children who come from vulnerable environments and who may lack parental guidance in this respect. In the quote below, the 7-year old daughter of one of these families explained to us that she once wanted to get in touch with a *"pretty lady"* she had seen on the internet, but she did not know how to do it. She also told us that she did not want to tell anybody about it even though she seemed to be aware that contacting a stranger was not safe:

> *B9g7: Once I also saw a very pretty lady with clothes and that. And I found her pretty to become my friend. But I didn`t tell anyone about it. I didn't want to.*
>
> *Interviewer: So you wanted to become friends with the lady?*
>
> *B9g7: [nodding] I kept it to myself.*
>
> *Interviewer: And did you get in touch with the lady?*
>
> *B9g7: What do you mean?*

Interviewer: Did you talk to her or send her a message?

B9g7: But I`ve never seen her! I never see her. I live in [name of town] and I don't know where she lives.

Interviewer: Ah, OK. So you don`t know where she lives, but you would like to meet her anyways?

B9g7 [nodded].

Interviewer: And if you get to meet her, do you think that would be safe?

B9g7: No.

Finally, as illustrated by the mother of three young children (6 and 4), families feel that they would benefit from the availability of more positive, educational and safe (online) content for young children. However, many of them do not know where to find it:

> *"And then I think it would be nice if there would be a platform for online safe Apps. And the network would be kept up to date, that you can go up there and they are like educational, and that they always work because sometimes they have good little Apps but next you'll go and they are not there anymore, like a brochure for parent to accompany it" (B4m).*

4.2 Rules

Rules originate within the family dynamics and involve a level of negotiation. They are not static or fixed and can be subject to change over time. In general, the older the child, the more rules are negotiated. Most parents in the sample do not have strict rules on media use, at least not for their youngest children. As their children's media use has not resulted in problems to date, they do not perceive a strong need for restrictive mediation, except setting up time limits. Many parents referred to the developmental stage their children are in and to the boundaries in which their children's media use take place (e.g. watching kids TV, browsing (innocent) YouTube videos, etc.). According to many parents, the need to impose more strict rules arises when children enter puberty and digital technologies such as social media become to be used.

Although most parents do not impose strict rules about media use, in nearly all families we observed limits related to usage, time, and content. Families differ in the extent to which children are allowed to use specific technological devices and the extent to which children need to ask permission before using them. In some families, certain devices such as portable gaming consoles or tablets are considered the 'property' of the children and as a result children do not need to ask whether they can pick up the device. In other families, on the other hand, children specifically need to ask whether they can engage in a digital activity. In general, the usage of more expensive, fragile (e.g. tablet) or personal (e.g. smartphone) devices is more strictly regulated. In the most extreme cases, children are not allowed to engage with devices without the help of a parent (e.g. Gamma family).

All parents consider it unhealthy to interact with digital technologies for an excessive amount of time and aim to embed the use of technological devices in a well-balanced and healthy diet of digital and non-digital activities.

FIG. 20 TIME-TIMER EMPLOYED BY THE DELTA FAMILY TO CONTROL TIME SPENT ON THE TABLET AND LAPTOP

Only in one family (Iota), in which the mum considers herself to be "addicted to television", children can fill in their leisure time completely as they wish. Most parents, however, do not limit their children's media use to a specific amount of time per day or per week. Instead, media use is either part of a routine (e.g. "one or two movie clips before bedtime") or based upon contextual factors (e.g. they can use technologies while parents are cooking, but not during dinner), and as a result it is limited in time. Only parents of one family with strong negative perceptions on digital technologies limit their children's use of technology to a maximum of 2.5 hours of "screen time" a week, based upon a reward system.

> *B10m: It is as follows (per day), if he does his homework well, because that is the problem. The reward system is that, if he does it in a reasonable amount of time and without making a fuzz, he earns half an hour of 'screen time'. (...) For example, if he does his homework in an orderly fashion three times, then he has an hour and a half. Then he can choose one time an hour and a half or three times half an hour.*

Finally, even though parents perceive few risks regarding the content their children are exposed to at this age, parents instruct children to ignore certain types of content. In particular as regards games on tablets or smartphones, children are not allowed to download content that is not free of charge and are requested to close advertisements.

Young children are in a developmental stage in which they sometimes lament but nevertheless not seem to question the rules their parents impose. Parents generally state that their children are obedient, but they also acknowledge that digital technologies, in particular games, can be very absorbing (hence the fear for addiction) and that it is sometimes necessary to ask children more than once to stop playing or to come to the dinner table.

5 Surprising findings

- Low digital family with a high digital literate child: In one of the families with practically no digital devices available we found one of the most highly literate children we interviewed.
- After/during interview "effect": Some of the children we interviewed asked their parents to get a Tablet or a game console. We are not sure, though, of this was one consequence of the interview
- Aspirational issues: Children love technologies and even though they may possess some such as a tablet, they always seem to crave for something else such a device they do not possess or a newer/better version of one they already have.
- For parents risks are a future concern only
- Children possess a very low level of awareness of services and platforms that are popular among adults, for example, social media. Two notable exceptions are YouTube and Skype.
- Skype only has positive connotations at home.
- Big discrepancies as regards values related to digital media are observed within some families.

6 Method

6.1 Procedure

In this section, the implementation of the study in Belgium is discussed. For a general overview of the protocol of observations and the protocol of analysis that were shared across participating research groups, we refer to these specific documents.

6.2 The sampling procedure

Given the exploratory nature of the pilot and the emphasis on selecting information-rich cases, theoretical sampling was used. The goal was to obtain a diverse sample in terms of children's ages and gender, family composition, ethnicity, and socio-economic status. Families were initially targeted using a flyer distributed via Facebook, schools and a sports club in the region of Leuven. Families with lower levels of economic or cultural capital, however, proved difficult to reach or reluctant to participate. We therefore distributed the call for participants in three schools in the region of Mechelen, where more families with low levels of socio-economic capital live. In addition, we contacted two community initiatives in the region of Leuven that support socially disadvantaged families. In the end, 39 families expressed interest in the study, of which 10 families can be considered to have a low level of economic and/or cultural capital. Families were chosen based upon the sampling criteria of diversity and the availability of the families in the data collection phase. In addition to the incentives provided by the Joint Research Centre, children were promised a Ketnet goodie bag and parents a small present (i.e. a bottle of wine).

6.3 The sample

Table 1 provides information on the basic demographic characteristics of the participants. As regards the Iota family, we could not extract specific details of some of the older children.

Family	Family code	Low – medium-high family income	Family member code	Sex	Age	Year school/ max level of education	Ethnicity
Alpha family	B1	High	B1m	Male	40	Tertiary	Latin
			B1f,	Female	41	Tertiary	Latin
			B1b6,	Male	6	1st grade	Latin
			B1g0	Female	0	/	Latin
Beta family	B2	Low	B2m	Female	39	High school	Asian
			B2b9	Male	9	3rd grade	Asian
			B2b8	Male	8	2nd grade	Asian
			B2b4	Male	4	Preschool	Asian
			B2bgm	Female	72		Asian
			B2bgf	Male	76		Asian
Gamma family	B3	High	B3m	Female	37	Tertiary	Caucasian
			B3f	Male	41	Tertiary	Caucasian
			B3b6	Male	6	1st grade	Caucasian
			B3b4	Male	4	Preschool	Caucasian
Delta family	B4	High	B4m	Female	35	Tertiary	Caucasian
			B4f	Male	34	Tertiary	Caucasian
			B4g6	Female	6	1st grade	Caucasian
			B4b4	Male	4	Preschool	Caucasian
			B4g4	Female	4	Preschool	Caucasian
Epsilum family	B5	Low	B5m	Female	Unknown	None	Asian
			B5f,	Male	Unknown	None	Asian
			B5b6,	Male	6	1st grade	Asian
Zeta family	B6	High	B6m	Female	36	Tertiary	Caucasian
			B6f	Male	40	High school	Caucasian
			B6g6	Female	6	1st grade	Caucasian
			B6b2	Male	2	/	Caucasian

Family	Family code	Low – medium-high family income	Family member code	Sex	Age	Year school/ max level of education	Ethnicity
Eta family	B7	High	B7m	Female	34	Tertiary	Caucasian
			B7f	Male	31	High school	Caucasian
			B7b7	Male	7	1st grade	Caucasian
			B7b4	Male	4	Preschool	Caucasian
Theta family	B8	Low	B8m	Female	37	Tertiary	Caucasian
			B8g6	Female	6	2nd grade	Caucasian/African
			B8g3	Male	3	Preschool	Caucasian/African
Iota family	B5	Low	B9m	Female	30	None	Caucasian
			B9f	Male	45	None	Caucasian
			B9g5	Female	5	Preschool	Caucasian
			B9g7	Female	7	1st grade	Caucasian
			B9?10	Unknown	10	Unknown	Caucasian
			B9g10	Female	10	Unknown	Caucasian
			B9b15	Male	15	Unknown	Caucasian
			B9b19	Male	19	Unknown	Caucasian
Kappa family	B6	High	B10m	Female	38	Tertiary	Caucasian
			B10f	Male	38	High school	Caucasian
			B10g6	Female	6	1st grade	Caucasian
			B10b9	Male	9	3rd grade	Caucasian

6.4 Implementation of the protocol of observations

The interviews were conducted in the home of the participants, with the exception of one interview. The Iota family preferred to discuss children's use of digital technologies at the facilities of the community service centre where the family was recruited.

The family visit was structured around four sections. For detailed information we refer to the shared protocol of observations. Information in italic refers to adaptations in the Belgian study as compared to the original protocol of observation shared with other teams.

1. **Introduction and briefing (10-15 min)**: Researchers introduced themselves and explained the main aims of the research project, the procedure, and participants' rights. Researchers asked if children could show (how they use) digital technologies during the interview as well as if pictures could be taken. This section of the interviews was concluded by signing the informed consent forms.

2. **Ice-breaker activity (25-30 min)**: Parents and children identified the structure of a typical weekday by matching time and activities using stickers. *In the first three interviews we also used a Fun line on which families indicated what activities they do together as well as rated them in terms of enjoyment. This activity did not result in meaningful data for the project, infringed on the time of the remainder of the interview and was therefore deleted.*

3. **Semi-structured Interview (30 – 60 min)**: Children and parents were interviewed separately in adjacent rooms. The following activities, materials and investigative methods were used with **children**:
   - *Suitcase: To spur the interest of children, researchers brought a child-friendly suitcase that housed the interview material.*

FIG. 21 CHILD-FRIENDLY SUITCASE WITH INTERVIEW MATERIALS

   - Card game: As foreseen in the protocol of observations the card game was used to initiate conversations on digital technologies. *In Belgium, we created an entire activity around the card game. We instructed children to flip through the cards and asked them to arrange the cards in three groups (what they like a lot/what they like/what they don`t like) or two groups in case of children under the age of five. Each category is represented by a smiley face (☺ / 😐 / ☹). Children wrote their name on post-its and linked these to the smiley faces.*

FIG. 22 EMOTICONS USED TO CLASSIFY ACTIVITIES

The interviewer then discussed the classification with the children. At the end of the card game children took pictures of the classification together with the interviewer. We added three non-digital activities to the card game to create a better balance between digital and non-digital activities.

- *Digital tour: Whenever allowed by the parents, children showed their favourite digital activities on one or a few devices, usually the tablet or smartphone.*
- *Screenshots: When digital technologies were not present in the home or could not be used, or because the limited time frame of the interview did not allow children to engage with many digital devices, we used screenshots to examine children's knowledge and skills related to digital devices and activities. Screenshots included pictures of amongst others TV remote controls, diverse gaming websites, e-mail clients, Facebook, Skype, and an iOS and Android lock screen and home screen.*

FIG. 23 SCREENSHOTS OF ANDROID LOCK SCREEN

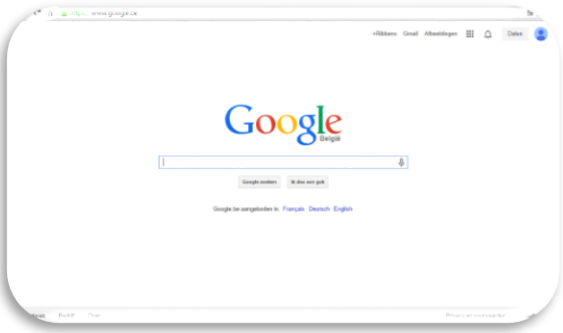

FIG. 24 SCREENSHOTS OF GOOGLE WEBPAGE

The Following investigative methods were used with **parents**:

- Traditional semi-structured interview using a topic guide.
- *Associations: As a way of summarizing, at the end of the interview, we presented parents with words they may or may not associate with their children's use of digital technologies. Parents flipped through the words and chose those words that apply to their children/family. The activity has proven very useful as it helps parents to summarize what they have discussed already during the interview, but also allows them to pick topics they have not discussed yet, but which nevertheless have some value to them.*

FIG. 25 WORDS CHOSEN BY THE ETA FAMILY

- *Tick off lists: Given the scope of the pilot project it was important to know what digital devices are present at participants' homes. Parents ticked off a list of devices they own, a list of devices their children own and a list of devices their children use.*
- Closing: Researchers asked parents whether there was anything else they would like to add.

4. **Closing (10 – 20 min)**: At the end of the interview, parents and children got together again and were asked if there was anything they wished to add to the interview. Researchers asked for basic demographic information, thanked participants and handed over the incentives.

6.5 Implementation of the protocol analysis

Each interview was recorded using voice recorders (2 x Olympus WS-110) and researchers' smartphones (Samsung Galaxy / iPhone 5) were used as back-up devices. During the interview researchers took notes in relation to the setting, technological devices available and surprising findings. The notes were added to the interview material for analysis.

After every interview a comprehensive debriefing took place during which the researchers discussed the setting, family members' responses to the four research questions and surprising findings. One researcher took notes and a number of debriefings are recorded.

The researchers, with the help of two students, transcribed each audio file verbatim. The emphasis was on the verbal component of the recording, but the most prominent changes in the tone of voice (e.g. enthusiastic, surprised, etc.) and acoustic elements (e.g. laughter) were taken into account. Colloquial language was not corrected.

Researchers' notes, debriefings, and transcripts were used as the basis for thematic analysis. In using thematic analysis, researchers search for patterns and themes in relation to the research questions. Researchers carefully read the interview material and assign codes to relevant segments. This coding process results in a list of codes that later in the analyses are refined, elaborated upon or deleted. Subsequently, researchers compare the material and choose a limited number of key codes that are useful to answer the research question. Within these key codes they search for similarities and differences, which are subsequently coded in subcategories. Finally, researchers aim to uncover connections between concepts. Given the short time frame of the project this process is ongoing.

Discussion of methodology

In addition to studying young children's use and perceptions of digital technologies, this pilot study aims to map methodological challenges and inspire future research. A first set of challenges and recommendations relates to the sampling procedure and the target group of the study (young children and their parents):

- **Other sampling techniques should be considered.** Given the exploratory nature of the pilot study and the emphasis on selecting information-rich cases, theoretical sampling was used. Although research based on a larger and more representative sample of families is needed, we also encourage future researchers to pay extra attention to families with low economic, cultural and/or digital capital because we have indications that the risks regarding digital technologies in these families are more strongly felt. Recruiting these types of families in a short time frame however proves difficult because these families are more difficult to reach or reluctant to participate. In Belgium, targeting community service organizations and schools located in socially disadvantaged areas proved valuable recruiting strategies. In addition, we advise researchers to be flexible in their sampling criteria. One family with low economic capital for instance preferred that the interview was conducted at the facilities of the community service centre where the family was recruited.

- **Interviewers should be able to converse with the participants in a language that is comfortable to them** in order to create a relaxed atmosphere and to avoid misunderstandings. This is especially relevant for socially disadvantaged families whose mother tongue is more likely to differ from official national languages.

- **The informed consent forms are too difficult to understand for some families**. A more user friendly version would also save time at the beginning of the interview.

- **Research on children's perceptions of digital technologies and parents' mediation strategies is often based on the account of a single parent** (cfr. EU Kids online). In this study however we observed remarkable differences between mother's and father's viewpoints (most notably in the alpha family, but also in the eta and kappa family). In order to fully understand the family dynamics as regards use and perceptions of digital technologies we advise to interview both parents whenever possible.

- **Young children, especially those that still attend preschool, cannot yet reason at an advanced or abstract level.** They find it difficult to provide us with elaborate answers and to go beyond what they like/dislike regarding a device/activity. The best way to extract information is to observe and talk to them while they are engaged in a digital activity or to use visual aids representing digital devices or activities.

- **The entire procedure takes two to three hours and is very intense, especially for young children**. Ideally, we would suggest that the interview is divided in two shorter sessions. In addition to minimizing the burden on young children, this would allow for greater opportunities to establish a trust relationship

as well as to validate preliminary findings. This is especially relevant as an (adult) interviewer's reality is used to make meaning of a child's reality.

- **A child friendly approach is needed to quickly gain the trust of the children and to extract valuable information.** Researchers need to be prepared to play with the children and stay longer whenever necessary.

A second set of challenges relates to the protocol of observations and its implementation:

- **The emphasis of the protocol of observations is on digital devices.** In reality, however, people talk about what they do using digital technologies. The device is a means to an end (e.g. playing games, watch videos on YouTube). We suggest redesigning the protocol of observations and to focus on digital activities instead of on digital devices.

- **Video recordings are an important tool to capture children's interactions with digital technologies.** Children often refer to an activity or a device as "this thing" and whenever possible show us how they interact with digital technologies (and thus swipe, point, play games, …). As a result, observations are a very important constituent of the methodology, yet the protocol of observations only allowed for audio-recordings. We strongly suggest future research to contemplate the use of video-recordings.

- **The protocol of observations foresees the presence of multiple children.** Besides the fact that interviewing multiple children is challenging, children are in different developmental stages and therefore require a different approach and adapted activities.

- **As a result of the variations between children (and families) it is paramount that the methodology remains flexible.** If the goal of the research is to include all or multiple children of a family, it is important that the interview material is flexible and can be adapted on the spot to the cognitive level of children who are in different developmental stages.

As explained, the flexibility of the protocol of observations proved to be an asset to the study and benefited our research We briefly describe which and why some of the interview techniques and activities used in interviews in Belgium proved (not) useful to map young children's experiences and perceptions of digital technologies and to keep children engaged during the interview.

- **The *My Day activity* overshoots its goal.** The activity gathers the entire family and helps to create a more relaxed atmosphere. Children genuinely enjoy using the stickers to construe a typical weekday. However, as weekdays are very packed with activities such as school, homework, dinner, etc. little information is actually gathered on digital technologies. On weekends there is more time to engage with digital technologies. In general, the activity is too time-consuming in relation to the expected outcome.

- **The card game works very well to initiate a conversation on digital technologies.** Children under the age of five however have difficulties creating three groups with activities. Usually they only make two categories, one group of activities

they like and one group of activities they don't like. We tried to make the card game more engaging (cfr. Methods).

- **The best method to explore young children's digital skills is to observe their interactions with digital devices.** These interactions however are a two-edged sword for researchers. On the one hand, they help researchers to grasp how children really engage, interact, and perceive technology. On the other hand, they make it sometimes difficult to redirect children's' attention back to the interview. Researchers should anticipate strategies to pull children back to the interview.

- **Observing children's interactions with digital technologies may not be possible during the interview.** It may be that a family has little or no digital devices, that parents are hesitant to let their children interact with digital devices with strangers, that devices are not charged, or that there is little time to explore children's understanding and skills of a variety of devices. In these cases, extra resources such as screenshots representing digital devices, activities and applications can stimulate interaction without the need of letting children engage with digital devices. At least in Belgium, these screenshots provided a valuable tool to get a first impression of children's knowledge, understanding and perceptions of digital technologies. Another possible strategy or back-up plan is to bring (cheap) digital devices to the interview that can be used by the children. The interviewer can also allow children to perform basic operations on his or her smartphone or tablet.

Similar to the methods we introduced in the interview with children, we explored ways in which researchers can improve data collection with parents.

- **The words presented to the parents at the end of the interview serve as a final reflection.** The activity creates a valuable summary as well as allows parents to pick up topics that are not or only briefly touched upon during the interview, but are nevertheless deemed important.

- **A short survey for parents on the use of digital technologies at home and basic socio-demographic information provides researchers with a valuable overview.** Given the scope of the pilot project it was important to know what digital devices are present at participants' homes. Parents ticked off a list of devices they own, a list of devices their children own and a list of devices their children use. This survey can be combined with a short survey on demographics and socio-economic characteristics of the family.

Conclusions

In this report we summarise the main findings of the 10 interviews conducted in Belgium with young children and their families. It was evident from our encounters with families that kids love technology and that digital technologies are an integral, although not a dominant part of their lives. Apart from playing digital games or watching videos, they also enjoy performing other non-digital activities such as sports, going to the playground or riding their bike. Young children mainly use digital technologies to have fun and to a lesser extent for bonding, i.e. a way of doing something together with significant others. Their favourite and most common activities are watching TV, watching video clips on YouTube and playing digital games. As opposed to children, parents mention that the main motives for their

children to use digital technologies are fun, learning, school-related tasks, "reward-punishment" strategy, baby-sitter", and only occasionally, a way of doing something together with their children (bonding). In spite of parents referring to positive aspects of digital technologies only a few of the children interviewed, and only the oldest ones, were able to use digital technologies in more advanced or creative ways. For instance some (older) children can make videos, take photos ('selfies') or do homework, but creative engagement with technologies is not widespread at this young age, nor is it actively encouraged by parents

Children usually use tablets or iPads to perform digital activities, although sometimes they also use their parents` smartphones (if they are allowed to) or game consoles. Several of the children interviewed, especially the oldest ones, are able to use tablets or iPads quite independently and have developed a number of skills (e.g. navigating across screens, searching for information, downloading Apps, etc.). Young children`s digital skills vary a lot from child to child, but in general they are low (as compared to older children or adults). Not surprisingly, the highest skills are observed among the oldest ones (e.g. finding the information they are looking for or downloading Apps). In general, all children have some grasp of device and game navigation. Navigation is notably eased when young children do not have to use the mouse or other game controllers. Because of their very limited search skills many young children turn to their parents to find the information they want.

Several factors affect young children`s uses and skills of digital technologies. These include family constitution, family and parental styles, daily routine, and even the neighbourhood. Above all, kids watch and learn from parents, but also from other relatives (e.g. siblings, uncles, and grandparents), friends and peers. Children`s perceptions of digital technologies are highly influenced by their parents` attitudes towards technologies, but also by their daily use.

Only the oldest children (6-7 year olds) seem aware of communication or social media functionalities such as Facebook, e-mail or instant messaging applications. None of the children interviewed had a profile nor were they active users of any of these services, though. The only exception was Skype, which had been used by half of the families in our sample. What all these families had in common was the fact that they had close relatives abroad.

As regards online risks, children have some level of awareness, especially about commercial and "technical" risks. Parents, on their turn, seem to trust that their young children will not get into trouble online. This is probably mainly due to the fact that parents feel that they are successful in monitoring their children`s use of online technologies (e.g. by limiting the time they can spend online, or by not allowing them to download online Apps or games). Parents, in general, seem much more anxious about the future risks their children may encounter than about current ones. This may be worrying because we were able to observe that even though young children, in general, enjoy quite safe (online) experiences, a few children in our sample mentioned (or we observed) having encountered less pleasant online experiences such as viewing *"ugly naked women*" or *"silly videos"* or being exposed to commercial information (usually targeting adults, but sometimes also children). Even though our sample of families is extremely small to make any generalizations, we observed that the few children who referred to unpleasant online experiences of any kind came from socially challenged environments and/or had parents with a low literacy level. In another family, economic constraints prevented children from accessing digital technologies. They did not have access to the internet or to cable TV because they could not afford it. The mother in this family, who had a university degree, worried that their children would become digitally excluded especially as they grow older and more digital resources are demanded from them at school.

It is, therefore, essential, to invest resources in studying more vulnerable children and their families, and to explore the ways in which these less privileged groups engage (or not) with digital technologies and the consequences thereof.

As observed in our study, parents are quite confident that very young children won`t get into trouble online and they feel quite successful in monitoring their children`s use of online technologies. Nevertheless, our study also shows that some children are exposed to less visible risks such as encountering inappropriate content, being commercially targeted or privacy risks. Enhancing children`s and their parents` digital skills, but also increasing their awareness of potential risks and how to cope with them is essential.

Even though lots of research has been published about older children and teenagers` experiences with digital technologies, very little research has focused on very young children, and especially vulnerable ones. An important challenge ahead is exploring adequate and innovative research mechanisms to reach and study these groups. Last, researchers should make efforts to gather evidence on the less explored, and more positive aspects related to the use of digital technologies by very young children. This could include the ways in which children and young people's use of digital technologies may contribute to creativity, informal learning and active cultural participation.

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